APPENDIX A

UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 96-2003

UNITED STATES OF AMERICA,
Plaintiff-Appellant,

v.

HOECHST CELANESE CORPORATION,
Defendant-Appellee.

CHEMICAL MANUFACTURER'S ASSOCIATION; CORPORATE ENVIRONMENTAL ENFORCEMENT COUNCIL; NATIONAL ASSOCIATION OF MANUFACTURERS; PHARMACEUTICAL RESEARCH AND MANUFACTURERS OF AMERICA; COMMONWEALTH OF VIRGINIA; VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY; SCIENCE & ENVIRONMENTAL POLICY PROJECT; TEXAS INSTITUTE FOR ADVANCEMENT OF CHEMICAL TECHNOLOGY INCORPORATED; NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS; TEXAS NATURAL RESOURCE CONSERVATION COMMISSION (TNRCC),

Amici Curiae.

No. 96-2051

UNITED STATES OF AMERICA,
Plaintiff-Appellee,

v.

HOECHST CELANESE CORPORATION,
Defendant-Appellant.

CHEMICAL MANUFACTURER'S ASSOCIATION; CORPORATE ENVIRONMENTAL ENFORCEMENT COUNCIL; NATIONAL ASSOCIATION OF MANUFACTURERS; PHARMACEUTICAL RESEARCH AND MANUFACTURERS OF AMERICA; COMMONWEALTH OF VIRGINIA; VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY; SCIENCE & ENVIRONMENTAL POLICY PROJECT; TEXAS INSTITUTE FOR ADVANCEMENT OF CHEMICAL TECHNOLOGY INCORPORATED; NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS; TEXAS NATURAL RESOURCE CONSERVATION COMMISSION (TNRCC),

Amici Curiae.

Appeals from the United States District Court
for the District of South Carolina, at Rock Hill.
Joseph F. Anderson, Jr., District Judge.
(CA-92-1879-0-17)

Argued: May 5, 1997
Decided: October 27, 1997

Before NIEMEYER and MOTZ, Circuit Judges, and
STAMP, Chief United States District Judge for the
Northern District of West Virginia, sitting by designation.

OPINION

DIANA GRIBBON MOTZ, Circuit Judge:

In 1984, pursuant to its authority under the Clean Air Act, the Environmental Protection Agency (EPA) promulgated regulations governing fugitive emissions of benzene, a carcinogenic pollutant posing significant risk to human health. This case involves the proper interpretation of those regulations, which impose numerous preven-

tative and reporting requirements on industrial plants emitting benzene, but exempt plants designed to use less than 1,000 megagrams of benzene a year from these requirements. The issue here is whether a plant owned by Hoechst Celanese Corporation (HCC) is exempted from the requirements of the regulations. If not, that plant (one of the largest sources of fugitive benzene emissions in the United States from 1987 through 1993) indisputably violated the regulations in numerous respects.

The district court sustained EPA's interpretation of its own regulations, an interpretation that did not exempt the HCC plant. *United States v. Hoechst Celanese Corp.*, 964 F. Supp. 967, 971-76 (D.S.C. 1996). Nevertheless, because the court concluded that the EPA did not provide HCC with "fair notice" of EPA's interpretation, the court declined to find HCC liable for any regulatory violations. *Id.* at 979-986. Both EPA and HCC appeal. In most respects, we affirm the judgment of the district court. That court correctly concluded that EPA's interpretation of its own regulations is entitled to deference. The district court also correctly held that EPA did not initially afford HCC fair notice of that interpretation and so the company cannot be held liable for violations of the regulations during the period (1984 to 1989) when it lacked fair notice. However, the court erred in concluding that HCC could rely on a fair notice defense for violations that occurred after 1989—when EPA provided the company with actual notice of EPA's interpretation of the regulations. Accordingly, we reverse the judgment of the district court in this single respect and remand the case for further proceedings consistent with this opinion.

I.

The United States, on behalf of EPA, initiated this action against HCC for alleged violations of the National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene (NESHAP or regulations), 40 C.F.R. pt. 61, subpts. A, J, and V (1996), at HCC's

Celriver plant in Rock Hill, South Carolina. The NESHAP provides controls on the amount of benzene that can be emitted into the atmosphere. EPA propounded these controls because it concluded that they could substantially "reduce the estimated annual incidence of leukemia" for persons living within 20 kilometers of plants with equipment that leaked benzene—roughly twenty to thirty million people. NESHAP preamble, 49 Fed. Reg. 23, 498, 23,501 (1984). Specifically, the NESHAP requires industrial plants that are designed to produce, use, or otherwise have in service benzene to monitor equipment regularly for leaks, repair leaks promptly, and install equipment that prevents, captures, or destroys benzene emissions. The regulations include reporting and recordkeeping requirements and provide that violations are to be punished by civil penalties.

The regulations, however, exempt "[a]ny equipment in benzene service that is located at a plant site designed to produce or *use* less than 1,000 megagrams of benzene per year." 40 C.F.R. § 61.110(c)(2) (1996) (emphasis added).[1] The exemption reflects EPA's conclusion that the benefit achieved by regulating small volume users of benzene does not justify the cost involved. *See* NESHAP preamble, 49 Fed. Reg. at 23,510. The question that divides the parties is what does "use" mean in the exemption.

The EPA defines "use" broadly to mean utilization, employment, or putting in place; this definition includes but is not limited to "consumption" of benzene, i.e., the overall amount needed to keep processes operational. The Celriver plant was designed to utilize benzene as a "quench" to cool hot ketene gases and as a "reflux agent" to help separate water and other compounds from acetic anhydride and acetic acid; after each of these uses the benzene was cooled, purified, and then recirculated as a "quench" or "reflux agent." Under EPA's definition of

[1] One megagram is equivalent to approximately 2,200 pounds.

"use," counting each time benzene circulated through pipes and valves capable of leaking, the Celriver plant was designed to "use" more than a million megagrams of benzene a year, and was not exempt from the NESHAP. Indeed, the Celriver plant not only "used" vast amounts of benzene, it also leaked substantial amounts of the carcinogen: as the district court noted, "the Celriver plant ranked in the top 5% of all plants reporting benzene fugitive emissions in every year between 1987 and 1993." *Hoechst Celanese*, 964 F. Supp. at 974.

Nevertheless, HCC claims the Celriver plant was exempt from the NESHAP. The company asserts that "use" in the exemption has only a single narrow meaning—"consumption." Since the Celriver plant continually recycled benzene, the total quantity it "used," under the company's theory, never exceeded 1,000 megagrams a year and thus the plant qualified for the exemption under 40 C.F.R. § 61.110(c)(2). The company concluded that the exemption was self-executing and for this reason HCC neither filed reports for the Celriver plant nor complied with any of the monitoring or other requirements of the regulations.

Because HCC never applied for an exemption for the Celriver plant or filed any reports as to its benzene usage, EPA did not become aware of the possibility of substantial benzene emissions at the Celriver plant until 1989. At that time, EPA's Region 4 office, which exercised enforcement authority over plants located in South Carolina, expressly notified the company in writing that if "benzene is recycled or reused in any process . . . the total cumulative flow through the process rather than net benzene consumption or usage" is to be counted as "use" of benzene for purposes of the regulations. After further communications between the parties, EPA determined that the Celriver plant had violated the NESHAP and so initiated this action.

EPA alleged that HCC, at its Celriver plant, violated NESHAP leak detection and repair requirements as well as requirements related to the installation of control devices, reporting, and recordkeeping. EPA asserted the Celriver plant did not qualify for the exemption and, even if it did, HCC could not claim this protection because it never applied to EPA for the exemption. In response, HCC argued that EPA's interpretation of the exemption was erroneous and merited no deference. Alternatively, HCC contended that if EPA's interpretation were accepted, HCC should not be held responsible for any violations of the regulations because it lacked fair notice of that interpretation. On cross-motions for summary judgment, the district court sustained EPA's interpretation of the regulations, but concluded that HCC lacked fair notice of this interpretation both before and after EPA's direct contacts with HCC in 1989. The court therefore refused to find HCC liable for any violations of the regulations.

II.

The Clean Air Act unquestionably provides EPA with broad powers to promulgate regulations necessary to identify and control hazardous air pollutants. *See* 42 U.S.C.A. §§ 7401-7671q (West 1995 & Supp. 1997). HCC makes no claim that the benzene regulations in any way violate or are contrary to EPA's statutory authority. *Cf. Chevron, U.S.A., Inc. v. NRDC*, 467 U.S. 837 (1984) (rejecting appellant's contentions that agency's interpretation conflicts with language and legislative history of statute). Nor does the company assert that either the Clean Air Act or the NESHAP contravenes any constitutional provision. Finally, HCC does not contend that EPA's procedures in promulgating the regulations were flawed. Thus, the initial question before us is simply whether EPA's interpretation of its own authorized, and properly promulgated, regulations should be accorded deference.

The Superme Court has continually reaffirmed that an agency's interpretation of its own regulations is entitled

to substantial deference. *See, e.g., Thomas Jefferson Univ. v. Shalala*, 512 U.S. 504, 512 (1994) ("We must give substantial deference to an agency's interpretation of its own regulations."); *Stinson v. United States*, 508 U.S. 36, 45 (1993) ("[P]rovided an agency's interpretation of its own regulations does not violate the Constitution or a federal statute, it must be given controlling weight unless it is plainly erroneous or inconsistent with the regulation."). When an agency applies its "regulation to complex or changing circumstances," the Court has explained, this "calls upon the agency's unique expertise and policy-making prerogatives" and courts must "presume that the power authoritatively to interpret its own regulations is a component of the agency's delegated lawmaking powers." *Martin v. OSHRC*, 499 U.S. 144, 151 (1991).

At least implicitly, HCC acknowledges that generally EPA's interpretation of property promulgated, statutorily authorized, regulations is entitled to deference. HCC contends, however, that "[t]his is not a deference case." Brief of Appellee at 22. The company asserts that the plain language of the NESHAP does not permit EPA's interpretation. It further argues that EPA's interpretation merits no deference because the agency assertedly did not espouse its present interpretation when it originally promulgated the regulations, but only "created" that interpretation "during this litigation."

A.

In resolving this question, we begin with the plain language of the regulations. The NESHAP itself does not indicate any intent to limit the meaning of the term "use" to consumption. Indeed, EPA's decision to give "use" a more expansive treatment than that advocated by HCC is consistent with the ordinary meaning of "use." *See Black's Law Dictionary* 1541 (6th ed. 1990) (defining "use" to include "to make use of, to employ" as well as "to put into action or service, to utilize").

Nor is the agency's broad interpretation nonsensical. After all, recycled benzene is just as likely to create a health threat as new benzene; each time benzene passes through a valve or pipe, it can potentially leak. Regulations designed to reduce the risk posed by this carcinogen should logically treat new and recycled benzene alike. Thus, EPA's interpretation of its own regulatory exemption harmonizes with the purpose of the authorizing statute, the Clean Air Act: "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population." 42 U.S.C.A. § 7401(b)(1) (West 1995). Congress mandated that EPA set emission standards that promote the public health and welfare with "the maximum degree in reduction in emissions of the hazardous air pollutants" subject to the Act, including cancer-causing benzene. 42 U.S.C.A. § 7412(d)(2) (West 1995). A broad reading of "use" certainly best achieves this goal.

Moreover, EPA's interpretation of its exemption accords with the purpose of the exemption itself. As the preamble to the regulations notes, the exemption was designed as a "small plant exemption" intended to exclude "most research facilities, pilot plants, and intermittent users of benzene." 49 Fed. Reg. at 23,510. EPA drafted the exemption in response to comments that the proposed NESHAP (which contained no exemption) was not cost effective for small plants, explaining:

> EPA believes it is reasonable to exempt plants from the standard when the cost of the standard is unreasonably high in comparison to the achieved emission reductions. Therefore, EPA decided to determine a cutoff for exempting these plants based on a cost and emission reduction analysis.

Office of Air Quality, EPA, Pub. No. 450/3-80-032b, *Benzene Fugitive Emissions - Background Information for Promulgated Standards* 2-104 (1982) (BID).

The agency recognized that industrial plants with the fewest pieces of equipment, and so the fewest sources of leaks, were probably the least likely to emit emissions. But it determined that it could not define the exemption in terms of number of pieces of equiqment or sources of leaks because such an approach "could not be applied readily to small or intermittent users of benzene" whose "facilities often require frequent repiping." BID at 2-104. Instead, EPA conducted studies and found that when the design production of a plant was about 1,000 megagrams per year, the plant contained 87 pieces of equipment and would be expected to emit only about 6 megagrams of benzene per year, applying the proposed regulations to such plants would only result in a reduction of 4 megagrams of benzene emissions per year. EPA concluded that the cost of imposing the regulatory requirements to such small plants was "unreasonably high *in comparison to the achieved emission reductions*" and so those plants could properly be exempted from the regulatory requirement. *Id.* (emphasis added).[2]

Accordingly, in formulating the exemption, EPA used the 1,000 Mg cut off rate as a proxy to exempt plants that had so few sources of leaks that they would be expected to emit only 6 megagrams of fugitive benzene per year. The Celriver plant most decidedly does not fall within that category. Rather, it had thousands of sources of benzene leaks (nearly 17,000 as of November 1990) and was one of the largest sources of benzene emissions in the nation during the period at issue in this suit, with annual emissions reaching 226 megagrams (nearly 500,000 pounds). Thus, HCC's Celriver plant was not

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[2] HCC asserts that this regulatory history only demonstrates that the purpose of the exemption "was to exempt facilities from implementing the standards of the benzene NESHAP where the *cost would be unreasonably high.*" Brief of Appellee at 26 (emphasis added). That argument, of course, overlooks the remainder of the language from the administrative record, which is quoted and emphasized above.

the kind of plant that EPA envisioned in creating the exemption.

In sum, EPA's interpretation accords with the plain language of the NESHAP, as well as the purposes of the Clean Air Act and of the exemption itself.

B.

Nevertheless, HCC asserts that EPA's interpretation merits no deference because it was one "created" after the fact for this litigation. HCC principally relies on isolated language in the preamble, BID, and EPA correspondence.[3] This scattered language hardly compels the company's interpretation of the regulations.

For example, in the preamble, EPA does occasionally employ the term "consume" in lieu of "use" in a discussion of the operations of pharmaceutical companies. *See* NESHAP preamble, 49 Fed. Reg. at 23,510. However, as the district court explained, this scarcely proves that

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[3] HCC erroneously asserts that "there are over 100 places in the rulemaking record where EPA uses the terms 'use' and 'consume' interchangeably." Brief of Appellee at 8. In fact, there are only a few occasions in the rulemaking record in which EPA employs "consume" in lieu of "use" and, as explained in text above, those instances are ambiguous. The additional references on which HCC relies are not contained in the rulemaking record at all. *See* 42 U.S.C.A. § 7607 (d)(7)(A) (West 1995) (defining rulemaking "record" for purposes of judicial review); 42 U.S.C.A. § 7412(e)(4) (West 1995) (applying § 7607 standards to emissions standards). Rather, they appear in correspondence with various EPA regional offices or state environmental agencies *after* the NESHAP was promulgated. Many of the references in this correspondence were authored by plant owners and operators, not EPA or other environmental agencies; furthermore, the agencies' use of "consume" in lieu of "use" even in the post-promulgation correspondence is subject to differing interpretations. *See infra* n.6.

HCC also refers to its interpretation of use as a "single counting" approach and denominates EPA's interpretation as a "multiple counting" approach. Although the district court adopted this nomenclature, it does not appear anywhere in the NESHAP or in the rulemaking record. Accordingly, we do not employ it here.

EPA limited the meaning of "use" in the regulations to "consume".

> These passages from the [administrative] record . . . do not lead inevitably to the conclusion that EPA intended the word "use" in the exemption to mean *only* "consume".

Hoechst Celanese, 964 F. Supp. at 976. (emphasis added). Clearly, one type of "use" is "consumption;" EPA does not claim to the contrary. The agency simply asserts that "use" also includes utilization or employment. Although the preamble contains evidence that "use" includes "consumption," it in no way requires the conclusion that "use" is limited to "consumption."

Similarly, EPA describes the exemption in the rulemaking record as establishing a cut off for "a plant design usage or throughput rate of benzene equal to or less than 1,000 Mg/yr per plant" and explains that "throughput" is "determined by a mass balance during the design stages of process operation, accumulating all benzene processed in 1 year." BID at 2-105. HCC asserts that "throughput" in this context can only refer to a "plant's overall net production or consumption . . . not recirculation rates." But again, the district court recognized that " 'throughput' and 'consumption' are not synonymous . . . . 'throughput can describe, for example, the flow of benzene through equipment like the quench chamber and main still"—just as EPA asserts.

Finally, numerous EPA letters issued in the summer and fall of 1984, shortly after the initial promulgation of the NESHAP in June 1984, severely undermine HCC's entire *post-hoc* argument.[4] For example, on August 20,

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[4] Recognizing the impact of these EPA documents, HCC urges (somewhat inconsistently with its claim that EPA's interpretation is an after-the-fact creation for litigation) that these documents demonstrate EPA's attempt immediately after promulgation of the NESHAP to narrow the exemption by broadening the meaning of "use." Brief of Appellee at 15. To prevail on this argument, HCC

1984, EPA answered an inquiry from a Texaco plant manager stating that "use" was to be determined by "the overall quantity of benzene used in equipment," not "consumption." On October 5, 1984, EPA told an applicant seeking an exemption, "the 1000 megagrams per year cut off limit is applicable to total *processing rates* rather than net consumption (usage) or net production, of all affected equipment at an entire plant site." (emphasis in original). That same month, EPA informed another exemption applicant that the "1,000 megagrams per year cut off limit is applicable to total processing rates, rather than net consumption (usage) or net production." A few days later, EPA wrote still another applicant that the "1,000 megagram per year cut off limit is applicable to total *processing rates* of all affected equipment at an entire plant site." (emphasis in original). The next month, EPA informed its regional offices that "We have determined the cut-off is based on the throughput or processing rate, rather than consumption." There are a number of other contemporaneous letters from EPA to the same effect. In view of this evidence, it is simply impossible to conclude, as HCC argues, that EPA formulated its broad interpretation of the exemption as a strategy for litigation initiated in 1992, eight years after the regulation was originally promulgated.

For all of these reasons, we agree with the district court that EPA's interpretation of its own regulations deserves deference.[5]

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would have to have demonstrated that "use" in the NESHAP necessarily meant only "consume." As noted above, the district court concluded and we agree that this conclusion is unwarranted.

[5] In reaching this conclusion, we give no weight to the 1995 affidavit of a former EPA employee, Robert Ajax, which was prepared and submitted on HCC's behalf for this litigation. Like similar affidavits from individual legislators, it is entitled to no weight as to the meaning of legislation enacted, or in this case a regulation promulgated, eleven years earlier. *See Consumer Prods. Safety Comm'n v. GTE Sylvania, Inc.*, 447 U.S. 102, 118 n.13

III.

The more difficult question is whether, and if so when, HCC was afforded fair notice of the EPA's interpretation.

Due process requires that a party must receive fair notice before being deprived of property. *Mullane v. Central Hanover Bank & Trust Co.*, 339 U.S. 306, 314 (1950). Moreover, it is well established in criminal law that no punishment can be imposed without notice. *See, e.g., United States v. National Dairy Prods. Corp.*, 372 U.S. 29, 32-33 (1963); *United States v. Bennett*, 984 F.2d 597, 605 (4th Cir. 1993). Although the Supreme Court has not directly addressed the question, we have concluded that because civil penalties are "quasi-criminal" in nature, parties subject to such administrative sanctions are entitled to similar "clear notice." *See First American Bank v. Dole*, 763 F.2d 644, 651 n.6 (4th Cir. 1985). A "regulation[ ] which allow[s] monetary penalties against those who violate [it], . . . must give . . . fair warning of the conduct it prohibits or requires, and it must provide a reasonably clear standard of culpability to circumscribe the discretion of the enforcing authority and its agents." *Id.* (quoting *Diamond Roofing Co. v. OSHRC*, 528 F.2d 645, 649 (5th Cir. 1976) (citation omitted)).

To determine if a party has received fair notice, we must examine the relevant facts of each case. *See Bennett*, 984 F.2d at 605. In this case, that requires separate examination of two time frames: (1) the period from 1984 (when the exemption was originally promulgated) to 1989 (when EPA became aware of the operations of the Celriver plant and directly contacted HCC); and (2) the period after the 1989 contacts between EPA and HCC until 1992, when HCC finally complied with the regulation). We address each period in turn.

(1980) ("Such history does not bear strong indicia of reliability . . . because as time passes memories fade and a person's perception of his earlier intention may change.").

A.

In support of its claim that HCC had fair notice of EPA's broad interpretation of the regulations from the time they were originally promulgated in 1984, EPA offers two interrelated arguments.

1.

First, the agency asserts that the plain language of the NESHAP and the rulemaking record should have put HCC on notice that the Celriver plant did not qualify for an exemption. For example, EPA contends that HCC should have known that its Celriver plant with nearly 17,000 pieces of equipment and substantial benzene emissions could not possibly be exempt. In support of this argument, EPA points out that "use" is a broad term, and that what is at issue here is an exemption and exemptions are to be narrowly construed. *See, e.g., Duquesne Light Co. v. EPA*, 698 F.2d 456 (D.C. Cir. 1983) (narrowly construing a Clean Air Act exemption). EPA also notes that the rulemaking record indicates that this was intended to be a "small plant" exemption designed to accommodate companies with limited use and emissions of benzene. *See* NESHAP preamble, 49 Fed. Reg. at 23,510. EPA maintains that if HCC had any doubt on the matter because of EPA's reference to "consume" in lieu of "use" in some portions of the rulemaking record, it had an obligation to contact the agency for clarification. *See, e.g., Texas E. Prods. Pipeline Co. v. OSHRC*, 827 F.2d 46, 50 (7th Cir. 1987) (finding fault with company's failure to make any inquiry of the administrative agency responsible for the regulations at issue).

EPA's argument is not without force and in another case might well carry the day. Generally, "ignorance of the law or a mistake of the law is no defense," *Cheek v. United States*, 498 U.S. 192, 199 (1991), and a claim of lack of notice "may be overcome in any specific case where reasonable persons would know that their conduct

is at risk." *Maynard v. Cartwright*, 486 U.S. 356, 361 (1988). However, as EPA recognizes, "it is crucial to examine the particular situation of the defendant, and whether *it* lacked reasonable notice." Brief of Appellant at 29 (emphasis in original). Examination of the particular facts of this convinces us that, prior to 1989, HCC did not have fair notice of the EPA's broad interpretation of the term "use."

Although as noted above, nothing in the NESHAP itself or the rulemaking record forecloses EPA's interpretation of the exemption, at the same time nothing mandates it. Indeed, some of the language in the preamble (e.g., EPA's references to "consume" in lieu of "use") supports HCC's narrower interpretation. Moreover, as the district court noted, just because the Celriver plant was not a small plant with few emissions, it was not necessarily put on notice that it was subject to the regulations, given that even under EPA's interpretation of "use," some plants with many pieces of equipment and significant emissions theoretically could be exempt. Thus, we cannot hold that the regulations, their preamble, or purpose clearly put HCC on notice that the Celriver plant did not qualify for an exemption.[6]

We need not determine if, as EPA maintains, the NESHAP and rulemaking record at least provided HCC with "reason to know that its exemption claim rested on

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[6] HCC also contends, and the district court held, that EPA regional offices assertedly interpreted the exemption inconsistently and that this provides additional support for the company's claim that EPA failed to provide it fair notice. *See Hoechst Celanese*, 964 F. Supp. at 981. Some of the EPA documents on which HCC relies can be read, as the company asserts, as providing conflicting interpretations of "use." Most, however, can at least as easily be read as consistently requiring EPA's broad interpretation whenever that question was raised and/or relevant. But given our conclusion that EPA failed to provide fair notice to HCC from 1984 to 1989, we need not reach the question of whether these documents constitute a proper additional basis for a grant of summary judgment on that question.

extremely shaky grounds" and so triggered an obligation to ask for clarification of the meaning of "use." Brief of Appellant at 31. If HCC did have such an obligation, it fulfilled it by communicating with the Texas Air Control Board (TACB), the state agency that EPA had empowered to implement and enforce the NESHAP in Texas.

The undisputed facts are as follows: in August 1984 (a few months after promulgation of the NESHAP), HCC sought information from the TACB as to whether an HCC plant located in Bishop, Texas, which also recycled benzene, was exempt under 40 C.F.R. § 61.110(c)(2). The TACB referred HCC to an August 1984 letter that EPA's Region 6 office sent to a Texaco facility in Texas that used recycled benzene. This letter stated that "*use* is not meant to imply consumption, but rather is meant to reflect the overall quantity of benzene used in equipment at a facility." This letter does seem, as EPA maintains, to support EPA's broad definition of "use." Indeed, contemporaneous HCC internal communications indicate that HCC itself so interpreted EPA's response; for example, one HCC official hand wrote on the Texaco letter "Read it and weep" and another HCC official wrote a memo noting "EPA recently advised . . . that 'use' of benzene includes recycle." However, the TACB interpreted EPA Region 6's letter to Texaco as indicating that overall inventory was the determinant factor. Thus, the TACB concluded that the Bishop plant qualified for an exemption because it did not maintain an *inventory* of more than 1,000 megagrams of benzene. In December 1984, the TACB sent a short letter to HCC informing the company that the Bishop plant was "exempt from the requirements of Section 61.112," the section mandating source compliance with the NESHAP. Although EPA Region 6 received a copy of that letter, it took no action to rescind or invalidate the exemption. HCC then concluded that the Celriver plant, which used benzene in a manner similar to the Bishop plant, was also exempt.

In addition to the Bishop plant, HCC operated another plant in Pampa, Texas. That plant, like the Celriver and Bishop plants, continually recycled benzene through a closed loop system but because the Pampa plant "consumed" more than 1,000 megagrams of benzene per year even under HCC's interpretation of "use," it was not exempt from the NESHAP requirements. For this reason, in September 1984, HCC applied to the TACB for a two-year waiver from compliance with the NESHAP for the Pampa plant so that HCC could "reduce the quantity of benzene consumed in the plant to less than 1,000 megagrams" and thus become exempt. In April 1985, the TACB approved the waiver request; copies of that request and TACB's approval were sent to EPA Region 6, which took no action to invalidate the waiver.

These undisputed facts demonstrate that, although HCC made no direct inquiry as to the application of the exemption to the Celriver plant, it did not fail to make *any* inquiry as to the meaning of the NESHAP. *Cf. Texas E. Prods.*, 827 F.2d at 50. Rather, it asked TACB for an exemption and wavier of the regulation for two HCC plants located in Texas, which recycled benzene just as the Celriver plant did. In response, TACB issued the requested exemption and waiver, with copies to EPA's Region 6. We recognize that although Region 6 received copies of TACB's letters granting the exemption and waiver to the Bishop and Pampa plants respectively, those letters were short and may not have fully informed the agency of their impact. But in addressing whether a party has received fair notice, we look at the facts as they appear to the party entitled to the notice, not to the agency. On the basis of the TACB's actions and the inaction of EPA Region 6, the company had reason to believe that its interpretation of the exemption—equating "use" to "consumption"—was accurate. When these facts are viewed in the context of a rulemaking record that included some references to "use" in lieu of "consume," we

must conclude that HCC did *not* receive fair notice of EPA's broader interpretation of the term in the 1984-89 period.

2.

As a corollary to the above argument, EPA asserts that the NESHAP required a plant owner to apply for an exemption and file an initial report and that HCC's failure to do either prevents it from now claiming a right to the exemption. As noted above, immediately after EPA issued the NESHAP in 1984, numerous other plant owners inquired as to the meaning of "use," applied for exemptions, and filed initial reports. HCC, in contrast, never applied for an exemption or filed reports.

The district court held that HCC's contacts with TACB constituted as "indirect[]," informal application for an exemption for the Celriver plant. *Hoechst Celanese*, 964 F. Supp. at 979. We cannot agree. Whatever the authority of the TACB or EPA Region 6 in Texas, they had no authority to grant an exemption in South Carolina and no ability to grant an exemption (by implication) to a plant about which they knew nothing. Thus, if the NESHAP had clearly mandated that the owner of a plant seeking an exemption apply for the exemption, HCC's Celriver plant failed to meet this requirement.

Accordingly, we turn again to the relevant regulatory language. The NESHAP provides in pertinent part:

> Any equipment in benzene service that is located at a plant site designed to produce or use less than 1,000 megagrams of benzene per year *is* exempt from the requirements of § 61.112.

§ 61.110(c)(2) (emphasis added). Thus, the plain language of the regulation suggests that the exemption is self-executing and provides no discretion to the EPA administrator to determine whether or not to grant an exemption. Section 61.110(c)(1) does state that "[i]f

an owner or operator *applies* for one of the exemptions in this paragraph," he must maintain certain records. (emphasis added). But it is impossible to conclude that this reference clearly requires a plant owner or operator to file an application for an exemption, in view of the absence of any explicit directive in § 61.110(c)(2), or any instructions in any other portion of the regulations as to how, where, when, or in what form such applications for exemptions are to be made. We note that elsewhere in the same regulations when EPA requires an application for a waiver of the NESHAP's requirements, it specifies in detail the procedures for the application. *See* 40 C.F.R. §§ 61.10(b), 61.11 (1996); see also § 61.112(c) (1996) (setting out procedures for application for an alternative method for attaining compliance). Thus, we do not believe the NESHAP provides fair notice that a plant owner or operator must apply for an exemption.

Nor do we believe the regulations provide fair notice that the owner of exempt equipment must file an initial report. The NESHAP requires an "owner or operator of [an] existing source" of benzene emissions to file an initial report within 90 days of promulgation of the regulations. 40 C.F.R. § 6.10(a) (1996). EPA asserts that the exemption in § 61.110(c)(2) does not allow an owner or operator to avoid the initial report requirement because that exemption only exempts "equipment," i.e., "sources," and does not eliminate reporting obligations imposed in other portions of the NESHAP on owners and operators of such equipment. EPA may be correct that this is what is intended. But we cannot hold that the plain language of § 61.10(a) provides clear notice of this intent. As EPA concedes, the reporting requirement is linked to the exemption provision; by requiring exempt companies to file reports, EPA can determine continued eligibility for that exemption. Since we have determined that HCC lacked fair notice of the need to apply for an exemption, we can not now hold it should have known to

submit reports to monitor continued eligibility for an exemption.

In sum, we agree with the district court that prior to 1989, HCC did not have fair notice of EPA's interpretation of the NESHAP or of a regulatory obligation to apply for an exemption or file reports.

B.

Finally, we must determine whether HCC continued to lack fair notice after 1989, when EPA's Region 4 office, the office responsible for enforcement of the NESHAP in South Carolina, directly informed officials at HCC's Celriver, South Carolina plant of the proper interpretation of the regulations.

1.

On June 13, 1989, EPA Region 4 wrote the HCC official responsible for regulatory compliance at the Celriver plant, informing him that "[i]f benzene is recycled" then "use" for purposes of the exemption must be calculated on the basis "of total cumulative flow through the process rather than net benzene consumption or usage." The EPA letter stated that "it appears that [HCC] may be subject" to the NESHAP requirements and asked HCC to forward information necessary "to determine the full extent and duration of all benzene emissions" within thirty days. Two weeks later, on June 26, HCC responded. Asserting that the Celriver plant recycled benzene and so under HCC's definition of "use," i.e., consumption, the plant was exempt, the company did not forward the requested information.

However, on July 28, 1989, senior HCC Celriver officials met to discuss the EPA's June 13 letter. Minutes of that July meeting indicate that by that time, HCC officials well understood that EPA did not accept the company's interpretation of "use." The minutes of the July meeting note in pertinent part:

> The EPA standard for fugitive benzene emissions may be applied to Celriver. *The limit of 1000 megagrams benzene per year (2,205,000 pounds per year) is applied to throughput instead of consumption. Process throughput or recycle is considerably greater than this limit.* Stringent EPA controls would thus apply to existing process equipment. *The full implication of this interpretation must be determined and steps taken to meet compliance.*

(emphasis added).

Moreover, unaware of HCC's internal discussions of the matter, on August 18, 1989, EPA Region 4 responded to HCC's June 26 letter noting that "it appears that you are unaware of EPA's interpretation of benzene usage as the term is used to determine applicability." In this letter, EPA proceeded to explain carefully and in no uncertain terms that benzene usage equaled "total cumulative flow through equipment in benzene service rather than net consumption." The letter contained an explicit example of how to determine usage in the exemption and asked HCC to forward the information originally requested in mid-June within thirty days. In September, still noting its objection to EPA's interpretation, HCC finally forwarded the requested information—pursuant to EPA's interpretation of "use," the Celriver plant's use of benzene exceeded 2.5 million megagrams of benzene per year. On February 20, 1990, EPA Region 4 issued HCC Celriver a notice of violation and in April 1990, HCC submitted a plan to redesign its Celriver plant to bring it into compliance with the NESHAP.

In short, HCC received in June 1989 a letter from EPA Region 4 unequivocally setting forth the agency's interpretation, and the record establishes that at least by July 1989 HCC well understood EPA's position. Moreover, in August 1989 EPA Region 4 expressly reiterated the interpretation stated in its June letter. Further, these 1989 letters from EPA Region 4 to HCC Celriver must

be regarded as representing the agency's authorative interpretation of the benzene exemption as it affected the Celriver plant. In its appellate brief, HCC itself concedes as much. *See* Brief of Appellee at 45 n.29 ("HCC does not dispute the fact that EPA Region IV is authorized to communicate the agency's interpretations of its own regulations to the regulated community.").

2.

In spite of these uncontroverted facts, the district court held that HCC "did not have actual notice" of EPA's interpretation "in the summer of 1989." *Hoechst Celanese*, 964 F. Supp. at 984. The court reasoned that EPA Region 4's 1989 letter to HCC were contrary to "statements" in the rulemaking record (e.g., "consume" in lieu of "use") and to other letters from EPA and state environmental agencies interpreting the NESHAP. *Id.* For this reason, the court concluded that HCC had a "legitimate basis for believing" that the 1989 letters from EPA Region 4—the region charged with supervision of the Celriver plant—did not "speak[ ] for the Administrator" of the EPA. *Id.* The district court further held that even the notice of violation could "not be deemed as having provided Hoechst Celanese an authoritative interpretation of the benzene exemption." *Id.*

With regard to the asserted conflict between EPA Region 4's 1989 letters to HCC Celriver and statements in the rulemaking record, the district court's conclusion is at odds with its earlier holding deferring to EPA's interpretation of the NESHAP. The district court initially held that it should and would defer to EPA's interpretation *inter alia* because the rulemaking record did *not* conflict with that interpretation. We believe, as explained above, that the district court correctly analyzed this issue at the outset of its opinion, when it concluded that "[t]hese passages from the record . . . do not lead inevitably to the conclusion that EPA intended the word 'use' in the exemption to mean 'consume.' " *Id.* at 976.

Accordingly, we necessarily must reject the argument that statements in Region 4's 1989 letters to HCC conflicted with the rulemaking record.

Nor can HCC rely on letters from EPA and state environmental agencies to other owners or operators about other facilities that allegedly adopt an interpretation of the exemption contrary to that which EPA directly conveyed to HCC Celriver in 1989. First, *no* communication from EPA Region 4—the office charged with enforcement of the NESHAP in South Carolina—conflicts with Region 4's definitive 1989 letters to HCC Celriver.[7]

As to the asserted contrary interpretation of "use" by other EPA offices or state agencies, HCC presents no evidence that the company knew of any contrary interpretations issued during or after 1989. Without contemporaneous knowledge of and reliance on these allegedly inconsistent interpretations, HCC had no reason to believe EPA Region 4 was providing it with anything other than EPA's definitive interpretation of the NESHAP.

Finally, the fact that previous letters from state environmental agencies concerning HCC plants in Texas and Virginia[8] assertedly conflict with Region 4's 1989 letters to HCC Celriver does not in anyway undermine the force of the latter. Whether a state environmental agency had previously supplied advice that may appear to conflict with EPA Region 4's definitive instruction to the Celriver

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[7] Thus, HCC's reliance on Region 4's communications with the Department of Energy's Savannah River Site (SRS) is misplaced. Based on information SRS initially supplied in 1989, the EPA could not determine whether the not-yet-built consolidated incineration facility (CIF) would be exempt. Subsequently, in 1995, upon learning that the CIF would recirculate benzene in amounts greater than 1,000 mg/yr, EPA concluded the operation would be subject to the benzene NESHAP.

[8] There is little evidence in the record as to the circumstances of the Virginia exemption. However, there is no evidence that any EPA regional office approved that exemption.

plant in the summer of 1989 is immaterial. In 1989, EPA Region 4, indisputably the office responsible for enforcement of the NESHAP in South Carolina, provided the HCC Celriver, South Carolina plant with unequivocal, actual notice as to how the regulation pertained to that plant's operations, i.e., benzene usage applied to "total cumulative flow through equipment in benzene service rather than net consumption." It is well established that "even if the agency has not given notice in the statutorily prescribed fashion, actual notice will render that decision harmless." *Riverbend Farms, Inc. v. Madigan*, 958 F.2d 1479, 1487 n.7 (9th Cir. 1992); *Shelton v. Marsh*, 902 F.2d 1201, 1206 (6th Cir. 1990) (same); *New York v. Bowen*, 811 F.2d 776, 780 (2d Cir. 1987) (same); *Small Refiner Lead Phase-down Task Force v. EPA*, 705 F.2d 506, 549 (D.C. Cir. 1983) (same) (dicta). *See also Maryland v. Antonelli Creditors' Liquidating Trust*, —— F.3d ——, No. 96-1111, 1997 WL 523681 (4th Cir. Aug. 26, 1997); *Greene v. Whirlpool Corp.*, 708 F.2d 128, 131 (4th Cir. 1983).

It would be another matter if different officials within EPA Region 4 had issued conflicting interpretive letters to HCC Celriver. But that is not the case here. The HCC Celriver plant received but one message from EPA Region 4—recycled benzene must be counted in determining how much benzene a plant is designed to use. Letters from the EPA regional office responsible for the State of South Carolina—regardless of any conflict with previous guidance received by another HCC plant from an agency with no authority in South Carolina—placed the HCC Celriver plant on actual notice of EPA's interpretation.

For these reasons, we must conclude that EPA Region 4's 1989 communications with HCC Celriver not only should have put the company officials at the Celriver plant on notice, but did put them on notice of EPA's interpretation of the NESHAP. Minutes from HCC's July 28, 1989 meeting convened after receipt of the first EPA letter supports this conclusion. These minutes unequivo-

cally demonstrate that HCC officials understood that "[t]he limit of 1,000 megagrams benzene per year . . . is applied to throughput instead of consumption." Moreover, if HCC had had any remaining doubts after receipt of EPA's first letter, EPA's second (August 1989) letter would have eliminated them.

3.

We also reject the district court's alternative grounds for refusing to find HCC Celriver liable for any violations of the NESHAP after August 1989. The district court apparently believed that imposition of liability was inappropriate for two additional reasons: (1) EPA did not object to the redesign schedule that HCC Celriver submitted in April 1990 to bring the plant in compliance with the NESHAP and the company made significant expenditures pursuant to that plan to reduce overall benzene use by August 1992; and (2) if HCC had applied for a waiver for the Celriver plant, it would likely have received one. *Hoechst Celanese*, 964 F. Supp. at 984-85.

At oral argument, HCC conceded, as it had to, that the present litigation solely addresses liability. Congress has directed that a court should address a "violator's full compliance history and good faith efforts to comply" not at the liability phase of the litigation but at the penalty phase. *See* 42 U.S.C.A. § 7413(e) (West 1995); *see also United States v. B & W Inv. Props.*, 38 F.3d 362, 368 (7th Cir. 1994) (applying § 7413(e) criteria in penalty deliberations). Thus, the district court erred when it factored in compliance efforts as a reason for denying *liability*.

Moreover, nothing in the NESHAP provides that upon receiving a proposed compliance schedule, EPA is deemed to accept that schedule if the agency does not respond within a certain period of time. Nor did EPA's lack of response to the proposed compliance schedule preclude it from imposing civil penalties on HCC. The only possible

legal basis for such a result would be an estoppel of some sort, and it is well-established that with rare exceptions "equitable estoppel will not lie against the Government as it lies against private litigants." *OPM v. Richmond*, 496 U.S. 414, 419 (1990); *see also United States v. Agubata*, 60 F.3d 1081, 1083 (4th Cir. 1995), *cert. denied*, 116 S. Ct. 929 (1996).

Finally, HCC cannot rely on the NESHAP waiver provision which states:

> Based on the information provided in any request . . . the Administrator *may* grant a waiver of compliance with a standard for a period not exceeding two years after the effective date of the standard.

40 C.F.R. § 61.11(a) (1996) (emphasis added). The regulatory language unambiguously provides that the grant of a waiver is within the EPA Administrator's discretion. EPA might—or might not—have granted the HCC Celriver plant a waiver if the plant had not met NESHAP's standards within ninety days, but HCC had no right to expect one. We will therefore not presume here that the company would have received a waiver.

Officials at the HCC Celriver plant had actual notice of EPA's interpretation of the NESHAP at least by the time they received EPA's August 1989 letter. The NESHAP mandates full compliance from an existing source within ninety days of the standard's effective date. *See* 40 C.F.R. § 61.05(c) (1996). Since HCC lacked fair notice of EPA's interpretation at the time of promulgation of the benzene NESHAP, the ninety-day period does not commence until HCC's received actual notice of that interpretation in August 1989. By failing to comply with the NESHAP's requirements within ninety days after receiving EPA's August 1989 letter, HCC Celriver necessarily violated the regulations. These violations continued at least until August 1992. We remand the case to the district court for consideration of the proper penalties, if any, for those violations.

IV.

We affirm the district court's order in all respects, except as to whether after August 1989, HCC Celriver had notice of EPA's interpretation of the NESHAP exemption. We hold that by August 1989, EPA had provided HCC actual notice that the Celriver, South Carolina plant did not qualify for that exemption. We remand the case to the district court so that it can determine if, and in what amount, penalties should be imposed for the post-August 1989 violations of HCC's Celriver plant.

No. 96-2003—*AFFIRMED IN PART AND REVERSED AND REMANDED IN PART*

No. 96-2051—*AFFIRMED*

NIEMEYER, Circuit Judge, concurring in part and dissenting in part:

I concur in Parts I., II., and III.A., but I find that I must dissent from Part III.B. I believe not only that the regulatory scheme was ambiguous but also that the EPA interpreted its regulations with considerable ambivalence, denying any person seeking to comply with them a consistent and clear course to follow. To penalize a company that, by concession of the majority opinion, was not given fair notice of any EPA interpretation at least until 1989 and then thereafter chose to follow one EPA Region's interpretation over another would be, in my judgment, fundamentally unfair. I have no difficulty with enforcing any consistent and rational EPA interpretation prospectively, but to impose penalties in the circumstances of this case is tantamount to punishment on the unfocused whim of a bureaucracy that could not itself agree on the proper reading of its own regualtion.

The Clean Air Act, 42 U.S.C. § 7401 et seq., creates a diverse regulatory scheme to lessen air pollution and confers broad power on the EPA to draft regulations to implement the statute. In 1984, the EPA published regulations to control the emission standards for equipment leaks of benzene, requiring industrial plants producing or using benzene to monitor for leaks, to repair leaks, and to install equipment to capture benzene emissions. The regulations also impose reporting and record keeping requirements. Violations are subject to civil penalty. Intending to exempt small volume producers and users of benzene because of cost concerns, the regulations exempt those plants that are designed "to *produce* or *use* less than 1,000 megagrams of benzene per year." 40 C.F.R.

§ 61.110(c)(2) (emphasis added). The issues in this case are whether Hoechst Celanese's Celriver (South Carolina) Plant *produces* or *uses* 1,000 megagrams of benzene per year and whether the EPA's interpretation of "produces or uses" was sufficiently clear to Hoechst Celanese in 1989 so as to justify imposing on it penalties for not complying with an EPA official's interpretation of the regulation within 90 days.

Reading the regulation on its face, the words "produces or uses" are complementary terms designed to provide a basis of measurement for the amount of benzene manufactured by or employed at a plant. The amount of benzene that a plant produces would seem to be a straightforward calculation measured by the amount of benzene that exits from a plant's manufacturing process. To measure the amount of benzene that a plant "uses" in a year would appear to require a measurement of the amount of benzene introduced into the manufacturing process during the course of a year. This natural reading would thus include in the amount all inventory of benzene in use at a plant during the entire year plus any amounts consumed by the process. If that total were less than 1,000 megagrams per year, one would expect that the plant would be exempt from regulation.

At different times and in different contexts, the EPA has shared in part my natural reading of the regulation. When the EPA first published its regulations, it appears to have assumed that its own regulations were to be read so that "use" means "consumption." This is reflected in the preamble to the regulation as originally published, where the EPA stated:

> The possibility that pharmaceutical operations could be adversely affected by the standard is very small. This is true for several reasons. First, most pharmaceutical plants use very little benzene. According to estimates contained in *Market Input/Output Studies —Benzene Consumption as a Solvent* (EPA-560/6-

> 77-034, October 1978, p. 41), 1978 benzene *consumption* by pharmaceutical manufacturers was about 0.72 Gg. No companies *consumed* more than 1,000 Mg/yr in 1978. The commenter states that they consumed about 325 Mg/yr during 1981. Thus, it is unlikely that pharmaceutical operations would be affected by the standard because the final standard exempts equipment at plant sites that are designed to produce or use 1,000 Mg/yr or less of benzene. Second, Benzene *consumption* by the pharmaceutical industry is declining rapidly. The market input/output study just noted estimates that *consumption* declined from 2.14 Gg in 1976 to 0.72 Gg in 1978, a decline of about 66 percent over the 2-year period.

49 Fed. Reg. 23,510 (June 6, 1984) (emphasis added). But when individual representatives of the EPA interpreted EPA regulations, they recognized that if benzene was introduced into a manufacturing process and exited it, the "throughput" should be the basis for measurement in determining "use." For example, on October 16, 1984, an internal memorandum from the EPA Standard Development Branch to another section provided:

> As you requested, I will articulate our position on the 1,000 Mg/yr plant site cut-off in the benzene equipment leak standard. This cut-off is based on an analysis showing plants having few [pieces of] equipment in benzene service should not be covered by the standard. This analysis relates the low number of [pieces of] equipment to a process rate in Mg/yr. *This process rate is not based on consumption of benzene but rather throughput through the equipment in all process units of a plant site.* The standard requires owners/operators to demonstrate the design capacity for each process unit in a plant, and we should sum these capacities and compare this sum to the 1,000 Mg/yr.

(Emphasis added). This position was reiterated a month later by the EPA's Office of Air Quality Planning and

Standards which issued a memorandum to all EPA Regional Air Program Branch Chiefs as follows:

> The question is whether the cut-off total is based on consumption or processing rate. We have determined the cut-off is based on the throughput or processing rate, rather than consumption.

While various persons at the EPA were debating whether "consumption" of benzene or the "throughput" was to be the basis for measurement, the EPA Regional Director from Region VI took the position that the benzene used was to be quantified in the same way as any inventory of a plant normally would be quantified:

> After review of [the regulatory provision], and based on our discussion with Headquarters' staff, we differ from you [Texaco] in our interpretation of the provision. It is EPA's position that the word *use* is not meant to imply consumption, but rather is meant to reflect the overall quantity of benzene used in equipment at a facility. In determining the environmental, health economic and energy impacts in setting the benzene standard, estimates were based on the number of pieces of equipment utilizing benzene and the quantity of benzene in use, rather than on the overall plant consumption (conversion) rate of benzene. Therefore, to determine if a plant produces or *uses* greater than 1000 megagrams per year of benzene, the total quantity of benzene in use at the facility needs to be considered, not the consumption.

(Emphasis in original). Region VI, thus, required the amount of benzene used to be measured by the "total quantity in use" at the facility—i.e., an inventory measurement. This letter, originally written to Texaco, was provided to Hoechst Celanese by the Texas Air Control Board in the course of giving Hoechst Celanese an exemption for its Bishop Plant in Texas, as it was authorized to do under the Act.

The EPA thus had at least three different approaches for measuring use: (1) the *consumption* of benzene in a year, (2) the *throughput* of benzene through a plant for a year, and (3) the *total quantity in use* at the plant.

In June 1989, the EPA Regional Director in Region IV, which included jurisdiction over Hoechst Celanese's Celriver Plant, wrote Hoechst Celanese that the Celriver Plant "may be subject" to benzene regulation and requested data on Celriver's benzene "throughput on an annual basis." When Hoechst Celanese responded that the Celriver Plant was exempt because it consumed less than 1,000 megagrams per year, the Region IV Director sent a letter stating that "it appears that you are unaware of EPA's interpretation of benzene usage as the term is used to determine applicability." The Region IV Director then explained: ,

> [B]enzene usage is intended to mean total cumulative flow through equipment in benzene service rather than net consumption[.] [Y]ou reported your benzene usage for the years 1984 through 1989 in terms of the amount of benzene added to maintain the levels in your closed recirculation system. Therefore, the paragraph below provides an example of how to calculate benzene usage for a hypothetical example. After reviewing the example, you should have a better understanding of how the term benzene usage is to be interpreted.

The letter then described how in a closed recirculation system, the benzene should be measured at a single point so that it is counted every time it passes a fixed point. The Region IV Director considered that this form of measurement was an acceptable interpretation of "throughput."

Up until this point, the EPA as an agency had not addressed how to measure benzene in a closed recirculation system. While the EPA Region VI Director applied the regulation to a closed system by directing the measurement

of the "total quantity in use" at the plant, the Region IV Director was interpreting it as the rate of flow through a single point in a closed system. Thus, Region IV proposed *re*counting the benzene every time it passed the single point. EPA Region IV did not, however, explain how many measuring points should be utilized. In a complex recirculation system made up of a grid of thousands of pieces of equipment, as was involved at the Celriver Plant, there are theoretically an unlimited number of measuring points at each joint and valve. Under this method, virtually any plant with a closed recirculation system would never qualify for the 1,000-megagram-per-year usage exemption.

While I agree with the majority that Hoechst Celanese had notice of the position of the EPA Region IV in August 1989, this notice should not, against the background of inconsistent EPA interpretations over time and throughout the different regions, constitute a definitive agency-wide EPA notice such that penalties could be imposed for non-compliance with one interpretation. For these reasons, I firmly believe that the district court properly concluded that the 1989 Region IV notice should not be considered the "authoritative interpretation" of the EPA.

I would go yet further and question whether the Region IV Director's notice is at all meaningful in view of the ambiguity about his interpretation.

For the foregoing reasons, I would affirm the district court's findings in their entirety.

APPENDIX B

[Filed May 10, 1996]

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF SOUTH CAROLINA
ROCK HILL DIVISION

C/A No. 0:92-1879-17

UNITED STATES OF AMERICA,
Plaintiff,

-vs.-

HOECHST CELANESE CORPORATION,
Defendant.

MEMORANDUM OPINION AND ORDER

Introduction

The question presented in this case is whether Hoechst Celanese Corporation's Celriver Plant in Rock Hill, South Carolina, was required to comply with the National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene (Benzene NESHAP), 40 C.F.R. Part 61, subpart J, during the period 1984 to 1991. The Company implemented the NESHAP in 1991 and subsequently eliminated the use of benzene altogether from the Celriver plant. Thus, the focus of this litigation is the 1984-1991 time period.

On behalf of the Environmental Protection Agency (EPA), the United States initiated this action against Hoechst Celanese for allegedly violating the Clean Air Act, 42 U.S.C. § 7401 *et seq.*, and the benzene NESHAP at Celriver. These regulations prescribe standards for

equipment in certain stationary sources that produce, use, or otherwise have in service benzene, a hazardous air pollutant, by requiring subject plants to monitor equipment regularly for leaks, to repair leaks promptly, and to install (in some circumstances) equipment that prevents, captures, or destroys benzene emissions. The regulations also include reporting and record keeping requirements. In its complaint, the United States seeks civil penalties of up to $25,000 for each violation.

The pertinent regulation provides an exemption for "any equipment in benzene service" that is "located at a plant site designed to produce or use less than 1,000 megagrams of benzene per year." 40 C.F.R. § 61.110 (c)(2). The EPA contends that the Celriver Plant was designed to use more than two million megagrams of benzene per year, and therefore was not exempt from the regulation. Hoechst Celanese contends that the Celriver Plant was designed to use (and, in fact, used) less than 1,000 megagrams of benzene per year, and therefore was exempt. The dramatic difference between the two calculations is caused by the different ways the parties count the benzene for purposes of the exemption.

The two approaches produce vastly different results because the Celriver Plant recycled benzene, continuously using the same benzene. The total quantity of benzene at the Celriver Plant site never exceeded 1,000 megagrams per year. Hoechst Celanese maintains that the benzene should be counted only once, and therefore the Celriver Plant was exempt under the regulation. EPA argues that the benzene should be counted each time it cycles through two separate points inside the system, and therefore the Celriver Plant was not exempt.

Hoechst Celanese further argues that, even if the exemption contemplated what it calls the "multiple count" [1] ap-

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[1] The government disagrees with the use of the words "multiple count" in describing its interpretation of the regulations. Whether

proach, the Company still should not be required to pay the civil penalty sought by the government because the Company did not receive the constitutionally required fair notice of the "multiple count" interpretation of the regulation.

The matter is now before the court on pivotal cross motions for summary judgment. The United States moved for partial summary judgment on the issue of liability for violations allegedly occurring between June 1986 and August 1992. The United States contends that Hoechst Celanese violated virtually all of the leak detection and repair requirements in the regulations, failed to install equipment designed to reduce fugitive benzene emissions, and failed to keep records and make reports to EPA. In total, the United States alleged thousands of violations of the Benzene Leaks NESHAP. Hoechst Celanese has cross moved for summary judgment on all claims. Oral argument was heard on both motions on February 2, 1996.

For the reasons set forth below, the court will grant the plaintiff's motion in part, by finding plantiff's interpretation of the applicable regulation to be reasonable. The court will also grant, in part, defendant's motion, concluding that because the Company was not afforded fair notice of the EPA's interpretation of the regulation, no civil penalty should be awarded in this case.

Summary judgment may only be granted under Federal Rule of Civil Procedure 56 when there are no genuine issues of material fact and the moving party demonstrates that it is entitled to judgment as a matter of law. The court must inquire into the genuineness and materiality of all purported factual issues and view all facts and inferences in a light most favorable to the party opposing the motion. *Drewitt v. Pratt*, 999 F.2d 774, 778 (4th Cir. 1993); *Ross v. Communications Satellite Corporation*,

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the government's gloss on the regulation is denominated "multiple count", "internal recycle", or something else is not significant for purposes of this decision.

759 F.2d 355, 364 (4th Cir. 1985). When no genuine issue of material fact exists, the court has a duty to award summary judgment. *Drewitt v. Pratt*, 999 F.2d at 778-79.

I

The Celriver Plant was exempt under 40 C.F.R. § 61.110(c)(2) if it was designed to produce or use less than 1,000 megagrams of benzene annually. The facts regarding benzene at the Celriver Plant are essentially undisputed. Until March 1993, the Celriver Plant used benzene in, among other things, the production of acetic anhydride.[2] Hot ketene gases flowed into a quench chamber and were cooled with a continuous stream of benzene, with some of the ketene thereby being converted to acetic anhydride. The benzene used to cool ketene gases was called a "quench." The substances in the quench chamber then moved to a main still. In the main still, benzene, water, and other substances rose to the top and exited, while acetic anhydride and acetic acid left from the bottom of the still. A stream of benzene flowed into the still to make this separation process more efficient. Benzene used to increase the efficiency of the main still was called a "reflux agent."

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[2] The facts in this section describing the Celriver Plant's design and use of benzene were derived from U.S. Mem. at 27-31, United States' Response to the Defendant's Motion for Summary Judgment and the Defendant's Opposition to the United States' Motion for Partial Summary Judgment ("U.S. Resp.") at 3-6, and Hoechst Celanese's Initial Brief at 26. The court's description of benzene use at Celriver focuses specifically on one of two process units at the plant, the acetic anhydride manufacturing process. A full description of this process is too technically complex to warrant its inclusion here, but the parties have provided a useful, if greatly simplified, depiction of certain of the most pertinent features of that process. The court notes that benzene was also used in another process unit at the Celriver Plant, the acid recovery unit. The Government does not discuss how benzene use would be calculated in this other process unit.

Benzene entering the quench chamber and main still had a prescribed temperature and purity. After it entered the quench chamber and main still, the benzene became hotter and less pure. For this reason, some of the benzene leaving the main still went through a series of steps that removed impurities and cooled the benzene back to its original temperature, while other portions of the benzene were recirculated immediately back to the main still. When the purification process was complete, the benzene that had been purified also recirculated back to the quench chamber and main still.

II

EPA contends that the Celriver Plant was not exempt because it was designed to use more than 1,000 megagrams of benzene annually. The court has jurisdiction to review EPA's interpretation, but "the scope of its review is limited to whether EPA's interpretation is plainly erroneous." *Potomac Elec. Power v. U.S. EPA*, 650 F.2d 509, 513 (4th Cir. 1981), *cert. denied*, 455 U.S. 1016 (1982). EPA's interpretation need not be the only reasonable one, or even the interpretation the court would have preferred if the question had first arisen in a judicial proceeding. *Udall v. Tallman*, 380 U.S. 1, 16-17 (1965). Rather, the "agency's interpretation of its own regulation is of 'controlling weight unless it is plainly erroneous or inconsistent with the regulation.'" *Talley v. Mathews*, 550 F.2d 911, 919 (4th Cir. 1977), *quoting Bowles v. Seminole Rock Co.*, 325 U.S. 410, 413-14 (1945). *See also Ford Motor Credit Co. v. Milhollin*, 444 U.S. 555, 566 (1980).

Courts defer to an agency's interpretation of its own regulation for pragmatic and constitutional reasons. Deference to the agency's view ensures that a nationally uniform interpretation prevails without the need for the Supreme Court to opine on the meaning of every regulation. *Homemakers North Shore, Inc. v. Bowen*, 832 F.2d 408, 412 (7th Cir. 1987). An agency is also more suited than

a court to make policy and scientific judgments within the agency's area of expertise. *Chevron U.S.A. v. Nat. Resources Def. Council*, 467 U.S. 837, 844-45 (1984) (deferring to EPA's interpretation of the Clean Air Act); *Citizens Against Refinery's Effects v. U.S. EPA*, 643 F.2d 178, 181-83 (4th Cir. 1981). Furthermore, courts recognize that Congress often confers upon an agency, rather than the courts, the province of "filling the interstitial silences within a statute or a regulation." *Milhollin*, 444 U.S. at 565.

A court's review of regulations under Section 112 of the Clean Air Act, such as the Benzene Leaks NESHAP, is particularly limited because of the broad discretion Congress gave EPA to control hazardous air pollutants. Under the Clean Air Act in effect when EPA promulgated the Benzene Leaks NESHAP, Congress delegated authority to EPA to identify hazardous air pollutants and their sources, to determine methods of controlling emissions from these sources, and to determine the level of control necessary to protect public health.[3] Through its exercise of these powers, EPA has developed considerable scientific and policy expertise in the regulation of hazardous air pollutants. *Natural Resources Defense Council v. U.S. EPA*, 824 F.2d 1146, 1163 (D.C. Cir. 1987) (*en banc*). This court treads lightly when construing the scope of an exemption that allows a source of hazardous air pollutants to go unregulated. The court will not substitute its own judgment on the scope of the exemption unless EPA's interpretation is plainly erroneous or inconsistent with the regulation.

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[3] Clean Air Act, sec. 4(a), §§ 111(b)(1)(A) and 112(b)(1), 84 Stat. 1676, 1684-85 (1970), sec. 110, § 112(e), 91 Stat. 685, 703 (1977), and sec. 13(b), § 112(e)(5), 92 Stat. 3443, 3458 (1978) (current version at 42 U.S.C. §§ 7411-12 (Supp. V 1993)).

III

A. *The Language of the Regulation*

The exemption that Hoechst Celanese claims reads as follows:

> § 61.110(c) , , , (1) If an owner or operator applies for one of the exemptions in this paragraph, then the owner or operator shall maintain records as required in § 61.246(I).
>
> (2) Any equipment in benzene service that is located at a plant site designed to produce or use less than 1,000 megagrams of benzene per year is exempt from the requirements of § 61.112.

The government argues that Hoechst Celanese does not qualify for the exemption provided for in section 61.110 (c)(2). Additionally, the government argues that even if Hoechst Celanese qualifies for the exemption, it nevertheless cannot claim the exemption in this case because it never affirmatively applied for the exemption. The court will address these issues seriatim.

1. *The Interpretation of the Exemption*

Interpretation of the exemption at issue in this litigation turns on the phrase "designed to . . . use" in section 61.110(c)(2).

EPA claims to give the word "use" its broad, ordinary meaning: to put into service, to employ, to utilize, to consume. In EPA's view, a plant is not exempt if, under its design, it uses benzene in one of these ways at a rate greater than or equal to 1,000 megagrams per year.

EPA maintains that the Celriver Plant was not exempt because it was not designed to use less than 1,000 megagrams of benzene annually. The Agency relies on the flow of benzene through two internal pieces of equipment in one process unit at the plant (namely, the main still

and the quence chamber in the acetic anhydride manufacturing process) in reaching that conclusion. As EPA sees it, that equipment in the Celriver Plant was not "designed to consume" benzene. Rather, the equipment was designed to "utilize" benzene as a quench and as a reflux agent in the manufacture of acetic anhydride. The acetic anhydride manufacturing unit of the plant was designed to use benzene as a quench by putting it into service in the quench chamber, and to use benzene as a reflux agent by putting into service in the main still. According to EPA, these two pieces of equipment in the acetic anhydride unit at the Celriver Plant were designed to put benzene into service at the rate of 1,517,700 megagrams per year. Because these rates exceeded the exemption threshold of 1,000 megagrams, EPA concludes that the Celriver Plant as a whole was designed to use more than 1,000 megagrams per year and, hence, did not qualify for the exemption.

Hoechst Celanese reads the exemption far differently. The Company agrees that the exemption is phrased in terms of a rate. Beyond that, however, EPA's and Hoechst Celanese's analyses diverge significantly.

At the very outset, Hoechst Celanese alleges that the Government's emphasis on the words "designed to use" is a litigation position embraced by the Government *post hoc*, and that the Government's explanation of the exemption can be found only in the papers it has filed in this litigation. As such, the Company contends, the "designed to use" argument is entitled to no deference from this court. According to the Company, "designed to use" merely indicates that a plant site's benzene usage is to be calculated on the basis of its maximum "design" or "nameplate capacity," rather than its "actual" capacity for any particular year. This is made clear, according to Hoechst Celanese, both from the context of the phrase as it is used in the exemption itself and from the rulemaking record.

Moreover, Hoechst Celanese argues, the Government's multiple counting explanation of the exemption strays far from any common understanding of the word "use." To illustrate, the Company gives the example of how much oil an automobile might be said to "use" in a year. An automobile that circulates several quarts of oil in its engine might plausibly be viewed as using either those several quarts of oil, or perhaps the amount of oil needed as "makeup" for that lost from the engine over the course of the year. Under multiple counting, however, the automobile would be said to "use" hundreds of thousands, if not millions, of quarts of oil per year.

Hoechst Celanese claims that, unlike the Government's multiple counting explanation, its interpretation of the exemption provision gives the word "use" its ordinary meaning. According to the Company, there are two dictionary definitions of the word that might apply in the context of the exemption: (1) to "expend or consume by putting to use," and (2) to "put into action or service: have recourse to . . .: to carry out a purpose or action by means of."[4]

At Celriver, Hoechst Celanese contends, the amount of benzene "used" in a year could thus mean either the amount of benzene the plant is designed to "use up" (*i.e.*, consume) over the course of a year, or the amount of benzene that the plant is designed to "utilize" or "put into service" over the course of year (i.e., the amount used up during the year plus the amount remaining in equipment at year's end). Either of these definitions is a "single counting" approach, the Company notes, contrasting them with the so-called "multiple counting" interpretation that the Government advances. The distinction is critically important, as it is not disputed that the Celriver Plant was exempt under either single counting interpretation.

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[4] Hoechst Celanese's Initial Brief at 53 *quoting Webster's Third New International Dictionary*, p. 2523-24 (1976).

2. *The Administrative Record*

Both sides assert that the administrative record supports their respective reading of the exemption language. Hoechst Celanese argues that the administrative record establishes that the exemption is based on the single counting concept of plant nameplate capacity or consumption, terms that are wholly incompatible with EPA's multiple counting approach.

For its part, EPA relies on the administrative record to support its claim that its interpretation is consistent with the purpose of the exemption. Typically, that portion of the administrative record formally adopted by the EPA Administrator (*i.e.*, the Preamble and rulemaking documents incorporated by reference in the Preamble) is to be read in harmony with the language of the regulatory provision so as to provide guidance as to the Agency's true meaning. I turn, then, to an examination of the administrative record.

Deference to an agency's interpretation is particularly warranted when the interpretation harmonizes with the purpose of the statutory scheme and the purpose of the regulations. *Mourning v. Family Publication Service, Inc.*, 411 U.S. 356, 369-72 (1973); *United States v. Unitank Terminal Service*, 724 F.Supp. 1158, 1165-66 (E.D. Pa. 1989) (interpreting the Benzene Leaks NESHAP).

One purpose of the Clean Air Act is "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population. . . ." 42 U.S.C. § 7401(b). To fulfill this purpose, Congress required EPA to promulgate emission standards for hazardous air pollutants that protect the public with an ample margin of safety. 42 U.S.C. § 7412. EPA promulgated the Benzene Leaks NESHAP under this authority in order to protect the public from benzene that leaks from equipment, a type of pollution known as "fugitive emissions." EPA believed

that these controls would significantly reduce the incidence of leukemia for people living within twenty kilometers of leaking equipment. 49 Fed. Reg. 23,501 (June 6, 1984). As discussed below, the exemption was intended to reach only plants that were not cost-effective to regulate because they had few pieces of equipment and low emissions from leaking equipment.

EPA drafted the exemption in response to a comment that Benzene Leaks NESHAP proposed in 1981 was not cost-effective for some plants. EPA agreed that an exemption for such plants was appropriate. In a document supporting the final regulations, the agency wrote: "EPA believes it is reasonable to exempt plants from the standard when the cost of the standard is unreasonably high in comparison to the achieved emission reductions. Therefore, EPA decided to determine a cutoff for exempting these plants based on a cost and emission reduction analysis." Benzene Fugitive Emissions—Background Information for Promulgated Standards, EPA 450/3-80-032b ("BID"), at 2-104.

EPA performed a cost and emission reduction analysis by analyzing actual data from plants that produced ethylene, cumene, and vinyl acetate.[5] Based on its review of five data points provided by the three studied production facilities, PES plotted lines purporting to make correlations between cost-effectiveness and (1) the nameplate capacity of plants producing so-called "synthetic organic chemical manufacturing industry ("SOCMI") chemicals, (2) emissions from such facilities, and (3) the number of pieces of equipment at the facilities.

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[5] EPA's description of this cost and emission reduction analysis appears in U.S. Mem. at Appendix B. The court notes that, while the PES Memo was part of the rulemaking record, it was not itself published in the *Federal Register*, nor were its contents fully explicated in the BID. Rather, interested persons had to be able to identify the PES memo as being relevant to the benzene exemption and could then obtain a copy only by writing to EPA and requesting it.

According to EPA, the data show a rough correlation between a plant's equipment count, emissions from leaking equipment, and plant production nameplate capacity, in that plants with higher production rates had more equipment and thus more fugitive emissions.

After assuming that the data it had derived from five data points was an accurate reflection of SOCMI production facilities generally, and by relating the data to benzene production plants, EPA's consultant plotted a correlation between plants with nameplate capacity producing 1,000 megagrams of benzene per year and benzene emissions of approximately 6 megagrams before regulation and emission reductions of about 4 megagrams after regulation. On the graph plotted by PES, emissions at these levels corresponded to plants having fewer than 87 pieces of equipment, such as valves, pumps, and pressure relief devices.

EPA determined that plants designed to use 1,000 megagrams of benzene per year would have approximately the same equipment count and emissions as plants that produced 1,000 megagrams of benzene annually. In the BID, EPA stated:

> For plants in which the benzene emission reduction achieved by implementing the standard is about 4 Mg of benzene per year, EPA has determined that the cost of achieving this emission reduction is unreasonable. In order to exclude plants on this basis, EPA selected a minimum cutoff of 1,000 Mg/year per plant site based on a benzene design usage rate or throughput.

BID at 2-105. The BID further explained that "[t]wo approaches for setting the [1,000 megagram per year] cutoff were considered: (1) number of sources at a plant site and (2) benzene usage per plant site." BID at 2-104. EPA said it rejected a "cutoff based on the number of sources at a plant site" because such a cutoff "could not

be applied readily" to small or intermittent users of benzene. *Id.* Rather, a cutoff "based on benzene design usage" was chosen "because it is easily understood and can be applied readily to a plant site." *Id.* The BID also indicated that it would be reasonable to exempt from the NESHAP plants emitting benzene in "significant quantities" when the "cost of the standard is unreasonably high in comparison to achieved emission reductions." BID at 2-104.

The Preamble to the Benzene Leaks NESHAP similarly explains that the exemption was based indirectly upon an analysis of equipment count and emissions. The Preamble states:

> EPA is exempting from the standard equipment at plant sites that are designed to produce or use 1,000 Mg/yr or less of benzene. This cutoff is based on the amount of equipment in a process unit and relates this amount to a design production rate. The 1,000 Mg/yr exemption would exclude most research facilities, pilot plants, and intermittent users of benzene from the standard.
>
> . . . .
>
> And finally, even though pharmaceutical operations that are designed to use benzene in excess of 1,000 Mg/yr are subject to the standard, they have substantial equipment inventories in benzene service, and, therefore, emit benzene in enough quantity to warrant coverage by the final standard.

49 Fed. Reg. 23,510 (June 6, 1984).

EPA contends that its position that the Celriver Plant did not qualify for the exemption is consistent with the purpose of the regulation. Unlike plants that EPA intended to exempt, EPA says, the Celriver Plant had thousands of pieces of equipment and high fugitive benzene emissions. Between June 1984 and February 1991, for example, the Celriver Plant operated almost 17,000 pieces

of equipment allegedly covered by the Benzene Leaks NESHAP. Between 1984 and 1993, the Celriver Plant's fugitive benzene emissions ranged between 69 and 226 megagrams annually. According to EPA's Toxic Release Inventory, the Celriver Plant ranked in the top 5% of all plants reporting benzene fugitive emissions in every year between 1987 and 1993.

EPA raises other arguments to support its claim of consistency with guidance in the administrative record on applying the exemption. In the BID, EPA drew a parallel between benzene use and benzene "throughput." According to EPA, the term throughput generally refers to the rate at which material is put through something, whether it be a system, a process, or a piece of equipment. Instead of looking at the "throughput" for the plant as a whole—which, as it explained below, Hoechst Celanese and its engineering experts contend is the only way for it to be consistent with the plant nameplate capacity element of the PES analysis and other aspects of the administrative record—the Government's multiple count approach would base eligibility on the throughput for one or more pieces of equipment inside the plant process. To accomplish this, EPA equates "throughput" with the term "processing rate," which, in turn, is more typically used when referring to the flow of material through a piece of equipment. This precise term, however, does not itself appear in the administrative record.

The BID states, "EPA selected a minimum cutoff of 1,000 Mg/year per plant site based on a benzene design usage rate or throughput. Throughput is determined by a mass balance during the design stages of process operations, accumulating all benzene processed in 1 year." BID at 2-15. This passage, EPA explains, describes both how throughput should be determined (by a mass balance),[6] and what benzene should be included (all benzene

[6] A "mass balance" is a technique based on the scientific principle that matter can never be destroyed. To apply a mass balance, one

processed in one year). The Government argues that the "mass balance" referred to in the BID was not intended to be conducted on the plant manufactuing process as a whole, but rather should really have been understood to contemplate one or more mass balances to measure the accumulated flow through pieces of equipment inside the plant manufacturing process selected by Agency staff after reviewing plant process diagrams.

Notwithstanding the fact that the term "processing rate" does not appear in the rulemaking record, EPA argues that the BID reiterates the connection between "use" and processing rate or throughput in several other places as well. In a summary section under the heading "Benzene Usage Cutoff," EPA stated:

> An analysis by EPA indicated that the cost effectiveness of the standard for equipment at plant sites processing less than 1,000 Mg/yr is unreasonably high. Because this cost is unreasonably high in comparison to the minimal emissions reduction, achievable, EPA provided an exemption for plants designed for low benzene usage.

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accounts for all mass or material entering, leaving, and remaining in a defined area. Typically, the accounting of a material is expressed in a mathematical equation. When all material is accounted for, the equation "balances." While both EPA and Hoechst Celanese agree with this general definition of the term "mass balance," they disagree profoundly over the scope of the "defined area" on which this mass balance is to be performed under the exemption. At Celriver, EPA instructed Hoechst Celanese to provide benzene usage figures derived from mass balance calculations on individual process streams. The Company contends that both the plain language of the exemption and rulemaking record indicate that the mass balance is to be performed on the "plant site" as a whole. Such a calculation, Hoechst Celanese maintains, is specifically intended to eliminate any multiple counting resulting from internal flow. For most facilities that use benzene in their manufacturing process, it would generally result in the measurement of a plant's consumption.

BID at 1-10. In response to a comment that research and development plants should be exempt, the agency stated:

> a plant design usage rate or throughput rate of benzene equal to or less than 1,000 Mg/yr per plant has been selected as a cutoff. Based on the minimal amount of benzene processed at laboratory facilities and pilot plants, the 1,000 Mg/yr cutoff is likely to exempt most of these sources from the standard. Large-scale pilot plants or commercial tests might process more than 1,000 Mg/yr. If this happens, these plants would not have difficulty in achieving the standard since there are no major equipment requirements and the work practice requirements are reasonable, considering costs and emissions reductions available.

BID at 2-105. In response to a comment from a pharmaceutical company seeking an exemption, EPA stated:

> And finally, even though pharmaceutical operations with a benzene throughput in excess of 1,000 Mg/yr are subject to the standard, they have substantial equipment inventories in benzene service and, therefore, emit benzene in enough quantity to warrant coverage by the final standard.

BID at 2-91.

EPA relies on these passages in support of its view that the Celriver Plant was not exempt. EPA contends that the Celriver Plant was not exempt based on the flow rate of benzene through two pieces of equipment inside the manufacturing process—the quench chamber and main still. EPA obtained this flow from among the mass balances that Hoechst Celanese prepared, at EPA's direction, on various benzene streams in Celriver's internal processes to show those streams' "throughput," which the Agency then defined as meaning "total cumulative flow

through equipment in benzene service rather than net consumption." [7]

Some parts of the administrative record provide support for the Defendant's "consumption" interpretation. Chief among these is a paragraph from the Administrator's Preamble which uses the word "consumed" or "consumption" four times, and appears to use the concept synonymously with the word "use". This paragraph reads as follows:

> The possibility that pharmaceutical operations could be adversely affected by the standard is very small. This is true for several reasons. First, most pharmaceutical plants use very little benzene. According to estimates contained in *Market Input/Output Studies —Benzene Consumption as a Solvent . . .*, 1978 benzene consumption by pharmaceutical manufacturers was about 0.72 Gg [gigagrams]. No companies consumed more than 1,000 Mg/yr in 1978. The commenter states that they consumed about 325 Mg/yr during 1981. Thus, it is unlikely that pharmaceutical operations would be affected by the standard because the final standard exempts equipment at plant sites that are designed to produce or use 1,000 Mg/year or less of benzene. Second, benzene consumption by the pharmaceutical industry is declining rapidly.

49 Fed. Reg. 23,510 (June 6, 1984) (emphasis added).

In its brief the government explains that the placement of the words "consumed" and "consumption" in close proximity with the word "use" in both the Preamble and the

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[7] Elsewhere in this same communication, the Agency observed that it "may be time-consuming to calculate actual annual benzene usage as interpreted by EPA," and indicated that the Agency "would be willing to review any estimation methods [Hoechst] Celanese might use in formulating a response" to the Agency's request. "Any response that relies that on estimation methods," EPA continued, "should contain enough backup information to allow us to evaluate the method used and the results obtained with it."

BID is 'accidental" and that EPA could have drafted these passages "more exactly".

Hoechst Celanese contends that the Preamble indicates that EPA intended to exempt small users of benzene, but EPA's multiple counting interpretation would virtually eliminate the exemption in even the simplest and smallest of recycle operations. Hoechst Celanese asserts, for example, that a research facility that intermittently recycles one gallon of benzene through an aquarium pump at a design flow rate of one gallon per minute would not be exempt.

Additionally, the precise term "processing rate," (the term relied upon by some EPA staff as the basis for a multiple count interpretation) is not mentioned anywhere in the record. Hoechst Celanese argues that EPA adopted nameplate capacity and specifically rejected "processing rate," a version of multiple counting, as unsuitable for this type of exemption. Moreover, it cites to a parallel EPA rulemaking to establish other standards for the synthetic chemical manufacturing industry where the use of that term was specifically rejected because it was "difficult to establish." The government argues that although the words "processing" and "rate" do not appear together in the BID, the BID does describe the scope of the exemption in terms of the rate at which benzene is processed.

Hoechst Celanese also points to the 1980 BID which listed the types of processes which were being considered for benzene regulation. The listed processes included those that produced benzene (refineries) and those that used benzene in the production of benzene derivatives. The 1980 BID had information on 133 sites, but did not list any of Hoechst Celanese's plants, some of which had been operating for decades.

These passages from the record, however, do not lead inevitably to the conclusion that EPA intended the word "use" in the exemption to mean only "consume." As the

Defendant concedes, a mass balance can be used to determine the flow of benzene through equipment. The Defendant prepared such a mass balance for EPA in order to show the flow of benzene through various parts of its plant, including the quench chamber and main still. Benzene throughput sometimes refers to a plant's benzene consumption, but the words "throughput" and "consumption" are not synonymous. The word "throughput" can describe, for example, the flow of benzene through equipment like the quench chamber and main still. Furthermore, EPA maintains that the Defendant has not shown how its consumption interpretation squares with the purpose of the Benzene Leaks NESHAP, which according to EPA was to control fugitive benzene emissions at all plants except those with few pieces of equipment and low emissions.[8] In sum, the passages cited by the Defendant from the administrative record do not establish that EPA's interpretation is plainly erroneous.

The court concludes that EPA's interpretation of the regulation is permissible and should be sustained by the court. Although Hoechst Celanese's interpretation of the regulation is also reasonable, the court must "refer to the reasonable judgment of the agency to which Congress has entrusted the development of rules and regulations to ensure [the protection of the environment]." *General Electric Co. v. EPA*, 53 F.3d 1324, 1328 (D.C.Cir. 1995). EPA's interpretation of 40 C.F.R. § 61.110(c)(1) is not "plainly erroneous or inconsistent with the regulation." *Tally v. Mathews*, 550 F.2d 911, 919 (4th Cir. 1977).

3. *The "Application" Argument*

EPA's other argument is that Hoechst Celanese never applied for the exemption it now claims for itself. Hoechst Celanese contends, on the other hand, that the exemption is self-implementing because the plain language of Section

[8] The Benzene Leaks NESHAP also exempts coke byproducts plants. 40 C.F.R. § 61.110(b).

61.110(c)(2) provides that a plant designed to use less than 1,000 megagrams of benzene per year "*is exempt* from the requirements." 40 C.F.R. § 60.110(c)(2) (emphasis added).

Courts look to the language and design of the whole law when construing the meaning of particular phrases, *U.S. Nat. Bank of Oregon v. Independent Ins. Agents*, 113 S.Ct. 2173, 2182 (1993), and avoid constructions that render words superfluous. *Ratzlaf v. United States*, 114 S.Ct. 655, 659 (1994). The paragraph containing the exemption begins, "[i]f an owner or operator applies for one of the exemptions in this paragraph . . . ." 40 C.F.R. § 61.110(c)(1). Elsewhere, the NESHAP requires that applications made pursuant to Part 61 should be sent to the appropriate EPA regional offices. 40 C.F.R. § 61.04.

The criteria that must be met for the exemption is specified in 40 C.F.R. § 61.110(c)(2). The regulatory language does not give EPA discretion in determining who qualifies for the exemption; a plant qualifies for the exemption if it meets the criteria set forth in the regulation. EPA still maintains, however, that this lack of discretion, does not make an application unnecessary.

The word "apply" in the regulation cannot be ignored. The EPA acknowledges, however, that the regulation does not specify the content of an application, nor does it give any real guidance as to an application procedure. Hoechst Celanese maintains that the regulation is self-executing and that the EPA has advanced the application argument only for the purposes of litigation and that in actual practice, the regulated community has not been applying for, nor have they been required to apply for this exemption. Hoechst Celanese also argues that key EPA staff have confirmed that there is no obligation to apply for the exemption.

EPA acknowledges that the ordinary meaning of the verb "apply" in 40 C.F.R. § 61.110(c)(1) means at least

that plants seeking the exemption must "communicate" their request to EPA.[9] Because of this, an examination of the communications between EPA representatives and the Company after promulgation of the NESHAP in 1984 is appropriate. The relevant facts, derived from the undisputed evidence in the record, are as follows.

In 1984 Hoechst Celanese operated two Texas plants that recycled benzene: the Bishop and Pampa Plants. Following the June 1984 promulgation of the NESAP, Hoechst Celanese undertook to determine the scope of the "use" exemption. The initial evaluation was made by Jaime Garza, a senior environmental engineer at Bishop. Mr. Garza considered a full range of regulatory interpretations—both plausible and implausible. He also asked for a review of the matter by in-house counsel, who evaluated the rulemaking record including the regulatory Preamble and the BID. After these evaluations, Mr. Garza concluded that "use" meant "consumption" and that Bishop was exempt because it consumed less than 1,000 megagrams per year of benzene.

On August 31, 1984, Mr. Garza wrote a letter seeking confirmation of Bishop's exempt status from the Texas Air Control Board (TACB), the agency to which EPA had delegated the authority to implement and enforce the benzene NESHAP in Texas.

Mr. Garza provided the TACB a detailed breakdown of annual bezene consumption and purchases for Bishop. His letter and attachments showed that Bishop recycled benzene and that its total consumption and purchases of benzene for each of the prior six years were less than 1,000 megagrams.

In response to Mr. Garza's letter, another TACB representative (Mr. Rodgers) informed Mr. Garza about an

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[9] The definition of the verb "apply" includes, "To ask or seek aid, employment, or admission." *Webster's II New Riverside University Dictionary.*

August 20, 1984 letter sent from EPA Region VI (EPA's regional office for Texas) to a Texaco Chemical Company facility in that same EPA Region. The letter to Texaco said that the term "use" was "not meant to imply consumption," but rather was "meant to reflect the overall quantity of benzene used in equipment at a facility," and that the "total quantity in use at a facility needs to be considered" not just consumption.

After receiving a copy of that letter in September 1984, Mr. Garza called the TACB and discussed the matter with Mr. Palmer, the director of the TACB region responsible for the Bishop Plant. After reviewing the Texaco letter and checking with EPA, the TACB told Mr. Garza that the TACB wanted additional information regarding the amount of benzene "kept at the Bishop Plant site at any point in time." In response, on October 22, 1984, Mr. Garza sent another letter to the TACB, explaining that the maximum amount of benzene present at Bishop, both in equipment and storage, was less than 1,000 megagrams a year.

Before responding to Mr. Garza's letters, Sabino Gomez, then Director of TACB's Compliance Division, conferred with EPA Region VI about EPA's interpretation of the word "use" in the exemption. From those conversations, Mr. Gomez understood that EPA interpreted the exemption to be based not on benzene consumption at a plant site, but rather on what a plant's inventory of benzene was. Mr. Gomez also specifically asked EPA Region VI "whether 'designed' is the key word in this rule." EPA Region VI staff, after consulting with EPA's Office of Air Quality Planning and Standards in North Carolina, informed Mr. Gomez, "design capacity, irrespective of actual use, is the operating factor." [10]

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[10] The government has not set forth any evidence which indicates that EPA told Mr. Gomez or anyone else at the TACB that "designed to use" was to be interpreted consistent with the multiple counting approach.

On the basis of those conversations with EPA and based on the information in Mr. Garza's August and October 1984 letters, the TACB confirmed—by letter of December 7, 1984—that Bishop was exempt from the benzene NESHAP. Significantly (for purposes of this litigation), as soon as Hochest Celanese received the confirmation letter from the TACB, it circulated the information to company personnel whose responsibilities included the Celriver Plant.

TACB sent EPA a copy of the December 7, 1984 letter confirming the exempt status of the Bishop Plant. After receiving the letter on December 21, 1984, EPA did not seek further information from either the TACB or Hoechst Celanese, nor did EPA indicate that it disagreed with the TACB's confirmation of the exempt status of a plant that recycled benzene as Bishop (and Celriver) did.

During this same period, Hoechst Celanese was also evaluating the terms of the exemption for its Pampa Plant. Like Celriver and Bishop, Pampa then recycled benzene continuously through a closed-loop system. Unlike Celriver and Bishop, however, in 1984 Pampa was consuming more than 1,000 megagram of benzene per year. Consequently, in September 1984, the Pampa Plant applied to the TACB for a two-year waiver from compliance with the benzene NESHAP so that the plant could become exempt from the benzene NESHAP by reducing "the quantity of benzene *consumed* in the plant to less than 1,000 megagrams." The TACB approved the waiver request for Pampa on April 9, 1985, stating that if benzene consumption were reduced to 1,000 megagrams per year by June 1986, the exemption would apply. Copies of both the waiver request and TACB approval were sent to EPA Region VI.

In June 1986, the Pampa Plant reported to the TACB that the facility had reduced its benzene consumption to less than 1,000 megagrams per year and was therefore

entitled to the exemption. The Company provided EPA Region VI with a copy of the letter. On December 9, 1986, EPA Region VI inspector George Marusak conducted a compliance monitoring inspection at the Pampa Plant, during which he and the TACB evaluated whether Pampa was in compliance with the benzene NESHAP. Dr. Marusak's Compliance Monitoring Report concluded that Pampa was exempt because it had reduced its "consumption of benzene to less than 1,000 Mg per year." This report was received and approved by Dr. Marusak's supervisors at EPA Region VI.[11]

As discussed later in this opinion, the Company did not communicate with EPA about an exemption specifically for the Celriver Plant until 1989. The facts reveal, however, that it was confirmed to the Company by EPA representatives that Hoeschst Celanese's other plants which used benzene in identical processes were exempt. Although the Company did not *formally* apply to the EPA for an exemption for Celriver, it did so indirectly through its communications with EPA regarding its Texas plants, which used essentially the same process as Celriver. Therefore, the court declines to accept the EPA's assertion that a formal application was a necessary prerequisite to qualifying for the exemption and concludes that the communications with EPA were sufficient to qualify for an exemption for the Celriver Plant.

IV.

The second issue before the court is whether Hoechst Celanese received fair notice of the government's interpretation of the benzene NESHAP exemption, as required under constitutionally based principles of due

[11] In addition to these two Texas plants, Hoechst Celanese also operated the Celco Plant in Virginia. In 1984, Virginia's State Air Pollution Control Board confirmed that the Celco Plant was exempt from the NESHAP based on a single counting of benzene at the plant site.

process. Hoechst Celanese is not liable and is not subject to penalties if the multiple counting interpretation described and deferred to above[12] is not "ascertainably certain" from the regulatory language and the Administrator's statements in promulgating the rule. *See General Electric*, 53 F.3d at 1328-29, 1333-34. For the reasons discussed below, the court determines that Hoechst Celanese is not liable and is not subject to penalties.

A. *The "Fair Notice" Standard*[13]

Where an agency has provided no pre-enforcement warning of its interpretation, the question facing a reviewing court is "whether the regulated party received, or

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[12] During the past 12 years, the government has provided several different, inconsistent articulations and applications of a multiple counting approach. Hoechst Celanese argues that none of those is a cogent explanation of how to apply a multiple counting approach in a manner that will consistently provide the same result at the same plant. In fact, although the government has calculated Celriver's "use" of benzene based on the benzene flow through two specific internal pieces of equipment at that plant, it is not clear why the government chose those particular pieces over the many other flanges, valves, and other pieces of equipment in benzene service at Celriver.

[13] The government contends that Hoechst Celanese is in actuality asserting a defense of estoppel. It is well-settled that estoppel generally does not run against the United States. *Office of Personnel Management v. Richmond*, 496 U.S. 414 (1990). This principle is grounded on the separation of powers doctrine. *U.S. v. Marine Shale Processors*, 1996 WL 185815 (5th Cir. 1996). ("Judicial adoption of estoppel based on agency misrepresentation would . . . vest authority in [government] agents that Congress would be powerless to constrain.") "Fair notice" on the other hand, is a principle rooted in the due process clause of the United States Constitution. *See Mullane v. Central Hanover Bank & Trust Co.*, 339 U.S. 306, 314 (1950) (The due process clause "prevents deference from validating the application of a regulation that fails to give fair warning of the conduct it prohibits or requires."). In determining that Hoechst Celanese should not be sanctioned in this case, the court relies on the fair notice doctrine, not principles of estoppel.

should have received, notice of the agency's interpretation in the most obvious way of all: by reading the regulations." *General Electric Co.*, 53 F.3d at 1329. Fair notice is not provided unless a regulated party acting in good faith is able to identify with "ascertainable certainty," on the face of regulations and other public statements issued by the agency, the standard to which the regulating agency expects it to conform. *Id.* Without such fair notice, the regulated entity does not commit a wrong when it fails to meet the regulatory standard.

Unclear or ambiguous regulations do not provide the requisite notice. If a violation of a regulation subjects private parties to criminal or civil sanctions, a regulation cannot be construed to mean what an agency intended but did not adequately express. *Gates & Fox*, 790 F.2d 154, 156 (D.C. Cir. 1986), *quoting Diamond Roofing Co. v. OSHRC*, 528 F.2d 645 (5th Cir. 1976). The test is "not what [the agency] might possibly have intended, but what [was] said." *U.S. v. Trident Seafoods Corp.*, 60 F.3d 556, 559 (9th Cir. 1995) (brackets in original).

A regulated party may also be found to have been given fair notice of the agency's interpretation in those situations where, prior to the commencement of enforcement efforts, the regulated party was given actual notice of the interpretation. *See General Electric. Co.*, 53 F.3d at 1329. However, such notice must be an "authoritative interpretation of the regulation" from the regulating agency. *Gates & Fox Co.*, 790 F.2d at 157.

Particularly compelling evidence that fair notice of a rule has not been given exists where the agency itself has not provided a definitive or consistent reading of the regulation. *See, e.g., General Electric Co.*, 53 F.3d at 1332; *Diamond Roofing Co.*, 528 F.2d at 649. When the "agency itself is uncertain of the meaning of its regulation" and "agency personnel give conflicting advice to private parties about how to comply with it," it is "arbitrary

to find the regulation 'clear.'" *Rollins v. Envtl. Services v. EPA*, 937 F.2d 649, 653 (D.C. Cir. 1991).

Due process concerns are clearly raised when unpublished "clarifying" interpretations cause the regulatory language and published guidance to be misleading. Misleading regulatory language, even if "clarified" with the best of intentions, is itself an ongoing cause of noncompliance and confusion. Unlike the unpublished clarification, the official language is clearly authoritative and available to the public. Only the agency can amend the regulation and publish guidance when correcting an "accident" to ensure that they clearly communicate the meaning that will be enforced. Awarding penalties where the problem is the language chosen by the agency, rather than any unwillingness to comply would only "delay the day when . . . regulations will be written in clear and concise language" so that regulated parties "will be better able to understand and observe them." *Diamond Roofing Co. v. OSHRC*, 528 F.2d 645, 650 (5th Cir. 1976).

B. *Information in the Regulatory Record*

Even though the court has deferred to the EPA's interpretation of the NESHAP exemption as permitting a multiple counting of recycled benzene, the court believes that the regulatory record in this case[14] does not provide fair notice of that interpretation. Indeed, Hoechst Celanese has provided numerous examples of ways in which rule-

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[14] The record includes the rule itself, the Preamble, and documents referred to and incorporated into the Preamble as part of the Administrator's further description and interpretation of the regulation. *See* 5 U.S.C. § 551(4) (definition of "rule" in the APA); 44 U.S.C. § 1507(4) (contents of the *Federal Register* "shall be judicially noticed"). Never having been superseded by a subsequent rulemaking, the Preamble is as much a current statement of what the regulation means today as it was when the benzene NESHAP was published on June 6, 1984. It provides evidence of the Administrator's intent. *See State of Vermont v. Thomas*, 850 F.2d 99, 103 (2nd Cir. 1988).

making record statements fail to give notice of a multiple count meaning. These examples and the court's analysis thereof, have been set forth on pages 19-21 of this memorandum opinion and order.

Additionally, Hoechst Celanese provides an affidavit from Robert Ajax, Chief of the EPA unit that actually developed the benzene NESHAP. Mr. Ajax states that EPA chose to have the exemption on benzene "use," based on single counting, because it was an easy-to-apply surrogate for the cost-effectiveness policy that EPA wanted the exemption to implement. It is "unequivocally clear," Mr. Ajax says, that "internal recycle"—*i.e.*, multiple counting—was never "considered [n]or suggested as the basis for the NESHAP exemption."

Similarly, the rulemaking record is inconsistent concerning EPA's claim that a multiple counting approach would ensure that facilities with low fugitive emissions or few pieces of equipment in benzene service would be exempt while those with higher emissions and more equipment would be subject to the NESHAP. As noted in Attachment F of Hoechst Celanese's Initial Brief, under the government's approach, some very large emitters of benzene would be exempt and some plants with very low emissions and very few pieces of equipment in benzene service would not be exempt.

In addition, the rulemaking record is somewhat inconsistent as to EPA's claim that it intended to exempt only small sources. The Preamble shows that EPA also intended to exempt users of small amounts of benzene—a category that would include all those that recycled benzene as a solvent or quenching agent, as was done at Hoechst Celanese's Celriver Plant and at the pharmaceutical facility described by—and declared to be exempt in—the NESAP Preamble, 49 Fed. Reg. 23510 (June 6, 1984).[15]

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[15] According to Hoechst Celanese, when EPA was developing its benzene NESHAP, refineries and feedstock users of benzene pro-

In this regard, the court also finds compelling that in the months (and years) following promulgation of the NESHAP, because of the confusion precipitated by EPA staffers' conflicting internal communications, various EPA offices understood the exemption in a variety of different ways.[16] In fact, the record in this case establishes that on various occasions from 1984 through at least 1990, EPA advised some facilities that they were exempt based on a single counting of recycled benzene and in other cases, EPA did not dispute state exemption decisions based on single counting. If the rulemaking record did not give EPA staffers notice of a multiple counting interpretation, it cannot reasonably be said that Hoechst Celanese should have understood that to be what the Administrator meant.

The court concludes from all this that although the multiple counting approach is reasonable enough to be sustained when deference is given to the government's present interpretation, the regulatory language and administrative record do not afford sufficient notice of the EPA interpretation.

C. *Actual Notice from Events in 1984-1986*

EPA argues that, apart from anything contained in the public record, Hoechst Celanese had *actual notice* that EPA was interpreting the benzene NESHAP exemption as requiring a multiple counting of recycled benzene. According to EPA, this defeats Hoechst Celanese's reliance on a "fair notice" defense. EPA's actual notice argu-

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duced or consumed millions of megagrams of benzene annually. In contrast, those that recycled benzene as a solvent or quenching agent —as Hoechst Celanese's Celriver Plant did—collectively used or consumed a total of only 1,500 megagrams annually.

[16] Hoechst Celanese points out that at least some of that confusion was generated by EPA staff's issuance of guidance documents that contradicted the Administrator's clear language in the benzene NESHAP Preamble (calling for single counting) and tried to develop alternative approaches.

ments are based largely on the previously described events that occurred in Texas after promulgation of the NESHAP, in particular Hoechst Celanese's receipt of a copy of the Texaco letter, which stated that the word "use" was to mean the "total quantity in use at a facility." [17] Although the Texaco letter cannot reasonably be said to have provided Hoechst Celanese with actual notice that its benzene usage was to be determined by multiple counting,[18] EPA argues that the Texaco letter did give Hoechst Celanese notice that the Agency did not intend to equate "use" with "consumption" and that, in turn, should have prompted Hoechst Celanese to ask EPA staff—rather than the TACB—whether its plants were exempt. Instead of seeking such confirmation, the government suggests that Hoechst Celanese chose to remain ignorant of EPA's reading of the regulation.

The court disagrees. This argument ignores that Hoechst Celanese sought—and received—confirmation of the exempt status of its plants from both State regulators

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[17] The government attaches significant weight to a handwritten phrase at the top of Hoechst Celanese's copy of the Texaco letter which stated "Read it and Weep". The words were written by Mr. Garza and the memo was sent to Jim Mullins, Garza's counterpart at Hoechst Celanese's Pampa Plant. The government maintains that this comment is affirmative proof that Mr. Garza knew that EPA had adopted the multiple counting approach. After reviewing this letter as a whole, the court declines to make this bold presumption. Rather, the court finds that the most plausible explanation for this comment was that Mr. Garza read this letter to mean that the EPA might be reading the exemption as calling for an evaluation of the overall quantity of benzene used at a plant—that is, the plant's consumption of benzene plus the amount of benzene in service at the plant. Mr. Garza testified that he believed this approach would not affect his plant, but would affect Mr. Mullins' Pampa Plant and thus, would require his colleague to work harder.

[18] Hoechst Celanese points out that according to the testimony of both the author of the EPA Region VI letter and the recipient of that letter, neither read it as saying that "use" is to be determined based on a multiple counting benzene at a plant site.

and EPA Region VI. In fact, Hoechst Celanese received a copy of the Texaco letter only because the Company went to the appropriate agency (the TACB [19]) and asked it to confirm the exemption's applicability. TACB responded to Hoechst Celanese's inquiry only after first conferring with EPA about the matter.

Nor does the court find merit in EPA's argument that the TACB's reading of the regulation was irrational and thus should have prodded the Company to seek further guidance from EPA. The TACB's single count application of the Texaco letter—although not based on just consumption—was still consistent with a single count "nameplate capacity" concept, which the NESHAP rulemaking record suggests may be the basis of the exemption.[20]

Other government arguments that the TACB's interpretation was invalid are not relevant here. The TACB was not saying that it advocated that interpretation. Rather, as explained by Mr. Gomez in his affidavit and by Mr. Garza in his deposition, the TACB was simply stating the interpretation that it thought was being advocated by EPA staff. The court finds unreasonable EPA's suggestion that Hoechst Celanese had an affirmative obligation to question its exempt status further when its plants were exempt based on (1) a "use equals consumption" reading of the rule, (2) an alternative ("use equals inventory") reading which both the TACB and Hoechst Celanese believed to be how EPA was reading the rule, and (3) any other

[19] As noted above, EPA had delegated to the TACB the authority to address these issues. The TACB did so, continually informing EPA what it was doing. There is nothing in the record to indicate that EPA at any time advised the TACB—or Hoechst Celanese—that the TACB's actions were improper as to either the Bishop or Pampa Plants.

[20] TACB had before it information reflecting not just consumption, but the "overall quantity of benzene" physically available to be used in one year—the amount on site at the beginning of the year plus all benzene added during the year to make up for consumption.

reading of the exemption that called for a single counting of benzene at a plant site. The whole point of the "fair notice" line of cases is that, as a matter of due process, the regulatory obligations to which persons are subject flow from what the regulations themselves say, with ascertainable certainty. Companies are not obliged to seek "clarifications" from agency staff of every conceivable ambiguity that might be lurking in regulatory language. An "actual notice" argument can be predicated only upon notice that Hoechst Celanese actually received, not upon notice it might have received if it had continued to make unlimited additional inquiries.

The court also finds compelling that even if Hoechst Celanese had asked more individuals within EPA about the meaning of the exemption, it is far from clear that the Company would have been told about EPA's multiple counting interpretation of the rule. As noted above, because of confusion generated in large part by internal memoranda from EPA staffers seeking to implement a multiple counting approach, EPA's regional offices were inconsistent as to how the regulation should be applied and, on various occasions from 1984 through at least 1990, told inquiring companies that the exemption was to be based on a single counting of recycled benzene.

D. *Evaluating Actual Notice After Commencement of Enforcement Against the Celriver Plant*

Finally, the Government argues that Hoechst Celanese cannot rely on its "fair notice" defense for any violations that occurred after the summer of 1989, when EPA Region IV (EPA's regional office in Atlanta) sent letters to the Celriver Plant concerning its compliance with the benzene NESHAP. The facts relevant to this argument, again derived from undisputed record evidence, are the following.

In June 1989, EPA Region IV sent a letter to Hoechst Celanese, stating that Celriver "may be subject" to the

benzene NESHAP and asking for information on Celriver's benzene "throughput on an annual basis." The letter defined "throughput" as the "total cumulative flow through the process rather than net benzene consumption or usage." Hoechst Celanese replied on June 26, 1989, reporting that Celriver was exempt because the plant's consumption of benzene was far less than 1,000 megagrams annually.

On August 18, 1989, in reply to Hoechst Celanese's June 26 letter, EPA Region IV sent a second letter stating, "it appears that you are unaware of EPA's interpretation of benzene usage as the term is used to determine applicabiilty . . . ." Attempting, in its words, "to clarify what is meant by benzene usage," EPA gave an example of how to calculate usage in a closed-recirculation system. In the example, benzene was considered "used" each time it was recycled. The letter indicated that this "interpretation of the term benzene use" was "based upon EPA Headquarters guidance provided shortly after [the benbene NESHAP] was promulgated" and that the basis for whatever was in that guidance (copies of which were not provided to Hoechst Celanese) was in the Agency's final BID.

In a September 1989 cover letter indicating that it did not then agree that multiple counting was a part of the benzene NESHAP exemption, Hoechst Celanese nevertheless provided the "throughput" calculations in the manner that Region IV had requested, by using flow rates at several points inside the process. This produced a Region IV-requested "throughput" calculation of over 2.5 million megagrams of benzene per year—a number that was orders of magnitude higher than the amount that the Celriver Plant ever had on site. While awaiting a response from EPA, Celriver also began work to determine what would need to be done to implement the NESHAP at the Celriver Plant if that was determined to be necessary.

On February 20, 1990, EPA Region IV sent the Celriver Plant a formal notice that EPA considered that plant to be in violation of the benzene NESHAP "based upon information provided by the [Celriver Plant] in response to EPA letters . . . dated June 13, 1989 and August 18, 1989." The Company set up a meeting with Region IV to discuss the exemption interpretation. At that April 1990 meeting, the Company affirmed that although it continued to believe Celriver was exempt, it would meet the terms of the benzene NESHAP at the Celriver Plant.

EPA Region IV then asked for—and within a few days received from Hoechst Celanese—the schedule that Hoechst Celanese intended to follow in meeting the terms of the NESHAP at Celriver. That schedule showed that while Hoechst Celanese could have implemented the NESHAP between 1990 and 1992 at a cost of between $2 and $3 million, the Company planned another much more expensive—approach, parts of which could be implemented more promptly. Specifically, Hoechst Celanese described a program to phase out the use of benzene entirely at one of its processes in less than one year, at an additional cost of $8 million. Hoechst Celanese estimated that it would be able to meet all remaining terms of the NESHAP no later than December 31, 1992.

The Celriver Plant then met the terms of the NESHAP by September 1991—*i.e.*, within approximately eighteen months of the time that Hoechst Celanese gave its compliance schedule to EPA and within approximately two years of the time the Government contends the Company was given actual notice of EPA's interpretation.[21] Later

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[21] By August 1991, the Company believed that it had implemented all the terms of the NESHAP except for one pressure relief device, which Hoechst Celanese apparently did not begin operating in conformity with the NESHAP until the following month. Following that time, as explained by counsel for Hoechst Celanese during oral argument, Hoechst Celanese conducted a voluntary environmental audit at Celriver to determine if all plant equipment in benzene service was meeting the terms of the NESHAP. As a

Celriver completely phased-out benzene usage at a cost of more than $40 million.

Based on these facts, the court concludes that it is inappropriate to find Hoechst Celanese liable or to impose penalties for actions it took between 1990 and 1992. The court bases this conclusion on several factors.

First, the court concludes that Hoechst Celanese did not have actual notice of EPA's multiple counting interpretation in the summer of 1989. The interpretation in the letters from EPA Region IV were, after all, contrary to statements in the Preamble and contrary to the interpretations of the exemption that the Company had received from EPA Region VI, and state agencies in Texas, and Virginia. Thus, even if Hoechst Celanese may have known from its correspondence that individuals in the Atlanta regional office were then subscribing to a multiple counting interpretation of the exemption, Hoechst Celanese had a legitimate basis for believing that EPA's Region IV office was not speaking for the Administrator. In fact, the multiple counting reading of the exemption was not an authoritative reading even within Region IV since, during the same time period, other individuals within EPA Region IV were interpreting the exemption as calling for a single counting of benzene at a plant site.[22] Hoechst Celanese could not have been put "on notice" that EPA had adopted a multiple counting interpretation

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result of that self-audit, Hoechst Celanese discovered a single valve (out of a total of 174) that was not meeting the terms of the NESHAP; the Company replaced that valve by August 1992. The court concludes that Hoechst Celanese's treatment of this single valve does not warrant a finding of liability. Whatever the explanation, even this task was completed before the December 1992 deadline specified in the compliance schedule which Hoechst Celanese submitted to EPA.

[22] On June 26, 1989, EPA Region IV concluded that the U.S. Department of Energy's Savannah River facility (which recirculated benzene) would be exempt based on a its " 'design' benzene consumption rate."

when, at the same time, the Agency itself was not consistently embracing such an interpretation.

Similarly, this court concludes that none of EPA Region IV's communications with Hoechst Celanese—up to and including the issuance of a notice of violation (NOV) on February 20, 1990—can be deemed as having provided Hoechst Celanese an authoritative interpretation of the benzene exemption, when that interpretation is contradicted on its face by the language used by the Administrator in promulgating the final rule and was not communicated to Hoechst Celanese by the Agency as a whole.[23] Even though the court today concludes that the multiple counting interpretation is a "permissible" reading of the benzene exemption, that ruling does not reach back in time to establish that multiple counting was the Agency's consistently held interpretation in 1989, 1990, or even in 1992, by which time the Celriver Plant was meeting all the terms of the benzene NESHAP.

In any case, this court need not decide whether (and, if so, when) Hoechst Celanese was given authoritative actual notice of the Agency's present interpretation. For even if Hoechst Celanese received actual notice, it is undisputed that Hoechst Celanese acted responsibly to meet —and far exceed—the terms of the NESHAP in advance of EPA-accepted deadlines. In fact, by spending an additional $8 million, it did so within the two-year compliance period that was available to qualifying sources under the waiver provisions in the NESHAP.

It is also undisputed that EPA never objected to the compliance schedule submitted by Hoechst Celanese in

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[23] Hoechst Celanese has pointed out that just one week after EPA Region IV issued its NOV for the Celriver Plant, EPA gave another company a conflicting single count interpretation of the exemption. A February 28, 1990 EPA Region VI inspection report for the Howell Hydrocarbons facility (which recycled benzene in a manner similar to that at Celriver) indicated that facility was exempt from the benzene NESHAP because less than 1,000 megagrams per year of benzene was "purchased as make-up material."

April 1990. This is significant because had EPA at any point wished to compel Hoechst Celanese to meet the terms of the benzene NESHAP more expeditiously, it had options at its disposal that it never exercised.[24] In such circumstances, where Hoechst Celanese never conceded that it was subject to the NESHAP but nonetheless agreed to implement the requirements of the rule and where EPA never objected to—or took steps to shorten—the compliance schedule that Hoechst Celanese submitted, fundamental considerations of fairness argue against a finding of liability for that time period.

Underscoring this conclusion is the fact that the Clean Air Act did not contemplate immediate compliance with the benzene NESHAP. Section 112(c) of the Act—as it read at the time of promulgation of the benzene NESHAP—specified that those subject to a hazardous pollutant emission standard had 90 days from the effective date of the rule to come into compliance. This 90-day period, though, could be extended for up to an additional 21 months (a total of two years) upon satisfaction of the standards for a waiver. EPA's benzene NESHAP contains provisions mirroring the statute's two-year waiver requirement. *See* 40 C.F.R. § 61.11.

In summary, had the benzene exemption provided fair notice that the Celriver Plant was not exempt when the rule was first promulgated, the Company would have been able to apply for and likely obtain a waiver for Celriver—as it did for its Pampa Plant—giving it up to two years in which to come into compliance. And, the facts show, the plant would have been able to come into compliance within a two-year period. It was not the Company's fault that the opportunity to obtain a waiver may have passed by the time Hoechst Celanese was finally given actual no-

[24] For instance, EPA could have issued an administrative order pursuant to § 113(a) of the Clean Air Act or the Agency could have pursued a civil enforcement action for an injunction under § 113(b).

tice by EPA that the Celriver Plant was not exempt.[25] The Company's efforts to meet the terms of the NESHAP should be evaluated in light of the additional time for compliance to which it would likely have been entitled in 1984.

In light of the above facts, due process precludes a finding of liabiilty in this case. As one of EPA's own administrative law judges aptly put it:

> In order to continue to enjoy the confidence of the regulated community, the public, and the courts in the conduct of its enforcement activities, the government must "occasionally bear the consequences of unclear wording in the extensive and detailed implementing regulations for its statutory responsibilities. This should be regarded as a small price to pay for the maintenance of credibility and public trust, and for a reputation of fairness in dealing with the regulated community."

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[25] During oral argument, counsel for the government disputed whether the Celriver Plant would have qualified for a waiver, suggesting that waivers were not available for coming into compliance with leak detection and equipment tagging requirements. This ignores that Hoechst Celanese submitted to EPA, in April 1990, a comprehensive and coordinated plan for going beyond the terms of the benzene NESHAP and phasing out the use of benzene altogether in one of two process units at Celriver. Even if the court were to assume that extensions of time in order to comply solely with the leak detection and equipment tagging requirements were not generally contemplated under the waiver provision, the court is unwilling to conclude that the Agency would have been without discretion to grant Hoechst Celanese a waiver for the time necessary for the Company to implement its overall compliance plan, which included the additional environmental benefit of eliminating the plant's use of benzene in one process. *Cf. Monsanto Co. v.* EPA, 19 F.3d 1201, 1207 (7th Cir. 1994) (The Clean Air Act's "waiver" provision does not require the source to install the controls that will achieve compliance at the earliest possible date," and if a company "has a choice between two control strategies, the EPA has authority to grant a waiver for a pollution prevention strategy even if that strategy would take slightly longer to implement than a less desirable strategy.").

In Re Phibro, 1994 CAA LEXIS 18 (Oct. 5, 1994) (Ex. 110), *quoting In the Matter of K. O. Mfg., Inc.*, Docket No. EPCRA-VII-89-T-611 at 17 (Feb. 28, 1993).

Conclusion

For all of the foregoing reasons, the court hereby determines that the EPA's interpretation of 40 C.F.R. § 61.110 (c)(2) is permissible and that interpretation is hereby sustained by the court. The government's motion for summary judgment is granted to this extent only. The court also grants, in part, the motion for summary judgment by Hoechst Celanese Corporation, awarding no civil penalty to the plaintiff because Hoechst Celanese did not receive fair notice of the EPA interpretation during the time period it was using benzene at the Celriver Plant. Each side shall bear its own costs.

IT IS SO ORDERED.

/s/ Joseph F. Anderson, Jr.
JOSEPH F. ANDERSON, JR.
United States District Judge

May 10, 1996
Columbia, South Carolina

[Order Omitted in Printing]

[Filed May 10, 1996]

UNITED STATES DISTRICT COURT
DISTRICT OF SOUTH CAROLINA
ROCK HILL DIVISION

C/A No. 0:92-1879-17

UNITED STATES OF AMERICA,
Plaintiff,

v.

HOECHST CELANESE CORPORATION,
Defendant.

JUDGMENT

Decision by the Court. This action came to hearing before the court. The Court having duly heard and granted in part the parties' cross motions for summary judgment.

IT IS ORDERED AND ADJUDGED that summary judgment is entered for the plaintiff, United States of America, as to the issue of the EPA's interpretation of 40 C.F.R. § 61.110(c)(2) and such interpretation is sustained by the court.

IT IS FURTHER ORDERED AND ADJUDGED that summary judgment is entered for the defendant Hoechst Celanese as to the issue of awarding no civil penalty to the plaintiff.

Each side shall bear its own costs.

Date May 10, 1996
Columbia, South Carolina

LARRY W. PROPES
Clerk

/s/ Gail D. Hayden
By: GAIL D. HAYDEN
Deputy Clerk

APPENDIX C

Filed December 23, 1997

UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 96-2003
CA-92-1879-0-17

UNITED STATES OF AMERICA,
Plaintiff-Appellant
v.

HOECHST CELANESE CORPORATION,
Defendant-Appellee

CHEMICAL MANUFACTURE'S ASSOCIATION; CORPORATE ENVIRONMENTAL ENFORCEMENT COUNCIL; NATIONAL ASSOCIATION OF MANUFACTURERS; PHARMACEUTICAL RESEARCH AND MANUFACTURERS OF AMERICA; COMMONWEALTH OF VIRGINIA; VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY; SCIENCE & ENVIRONMENTAL POLICY PROJECT; TEXAS INSTITUTE FOR ADVANCEMENT OF CHEMICAL TECHNOLOGY INCORPORATED; NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS; TEXAS NATURAL RESOURCE CONSERVATION COMMISSION (TNRCC),
Amici Curiae

No. 96-2051
CA-92-1879-0-17

UNITED STATES OF AMERICA,
Plaintiff-Appellee
v.

HOECHST CELANESE CORPORATION,
Defendant-Appellant

CHEMICAL MANUFACTURER'S ASSOCIATION; CORPORATE ENVIRONMENTAL ENFORCEMENT COUNCIL; NATIONAL ASSOCIATION OF MANUFACTURERS; PHARMACEUTICAL RESEARCH AND MANUFACTURERS OF AMERICA; COMMONWEALTH OF VIRGINIA; VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY; SCIENCE & ENVIRONMENTAL POLICY PROJECT; TEXAS INSTITUTE FOR ADVANCEMENT OF CHEMICAL TECHNOLOGY INCORPORATED; NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS; TEXAS NATURAL RESOURCE CONSERVATION COMMISSION (TNRCC),

Amici Curiae

ON PETITION FOR REHEARING WITH SUGGESTION FOR REHEARING IN BANC

The appellee's petition for rehearing and suggestion for rehearing in banc were submitted to this Court. As no member of this Court or the panel requested a poll on the suggestion for rehearing in banc, and

As the panel considered the petition for rehearing and is of the opinion that it should be denied,

IT IS ORDERED that the petition for rehearing and suggestion for rehearing in banc are denied.

For the Court,

/s/ Patricia S. Connor
Clerk

APPENDIX D

FILED December 31, 1997

UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 96-2003
CA-92-1879-0-17

US

v.

HOECHST CELANESE

No. 96-2051
CA-92-1879-0-17

US

v.

HOECHST CELANESE

MANDATE

The judgment of this Court dated 10/27/97 takes effect today.

PATRICIA S. CONNOR
Clerk

APPENDIX E

Excerpt from Section 112 of the Clean Air Act (Pre-1990)

§§ 7412. National emission standards for hazardous air pollutants

(a) Definitions

For purposes of this section—

(1) The term "hazardous air pollutant" means an air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(2) The term "new source" means a stationary source the construction or modification of which is commenced after the Administrator proposes regulations under this section establishing an emission standard which will be applicable to such source.

(3) The terms "stationary source", "modification", "owner or operator" and "existing source" shall have the same meaning as such terms have under section 7411(a) of this title.

(b) List of hazardous air pollutants; emission standards; pollution control techniques

(1)(A) The Administrator shall, within 90 days after December 31, 1970, publish (and shall from time to time thereafter revise) a list which includes each hazardous air pollutant for which he intends to establish an emission standard under this section.

(B) Within 180 days after the inclusion of any air pollutant in such list, the Administrator shall publish proposed regulations establishing emission standards for such pollutant together with a notice of a public hearing within thirty days. Not later than 180 days after such publica-

tion, the Administrator shall prescribe an emission standard for such pollutant, unless he finds, on the basis of information presented at such hearings, that such pollutant clearly is not a hazardous air pollutant. The Administrator shall establish any such standard at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant.

(C) Any emission standard established pursuant to this section shall become effective upon promulgation.

(2) The Administrator shall, from time to time, issue information on pollution control techniques for air pollutants subject to the provisions of this section.

(c) Prohibited acts; exemption

(1) After the effective date of any emission standard under this section—

(A) no person may construct any new source or modify any existing source which, in the Administrator's judgment, will emit an air pollutant to which such standard applies unless the Administrator finds that such source if properly operated will not cause emissions in violation of such standard, and

(B) no air pollutant to which such standard applies may be emitted from any stationary source in violation of such standard, except that in the case of an existing source—

(i) such standard shall not apply until 90 days after its effective date, and

(ii) the Administrator may grant a waiver permitting such source a period of up to two years after the effective date of a standard to comply with the standard, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of

persons will be protected from imminent endangerment.

(2) The President may exempt any stationary source from compliance with paragraph (1) for a period of not more than two years if he finds that the technology to implement such standards is not available and the operation of such source is required for reasons of national security. An exemption under this paragraph may be extended for one or more additional periods, each period not to exceed two years. The President shall make a report to Congress with respect to each exemption (or extension thereof) made under this paragraph.

(d) State implementation and enforcement

(1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing emission standards for hazardous air pollutants for stationary sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this chapter to implement and enforce such standards.

(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable emission standard under this section.

(e) Design, equipment, work practice, and operational standards

(1) For purposes of this section, if in the judgment of the Administrator, it is not feasible to prescribe or enforce an emission standard for control of a hazardous air pollutant or pollutants, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof, which in his judgment is adequate to protect the public health from such pollutant or pollutants with an ample margin of safety. In the event the Administrator promulgates a design or equipment standard under this subsection, he shall include as part of such standard such requirements as will assure the proper

operation and maintenance of any such element of design or equipment.

(2) For the purpose of this subsection, the phrase "not feasible to prescribe or enforce an emission standard" means any situation in which the Administrator determines that (A) a hazardous pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or (B) the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations.

(3) If after notice and opportunity for public hearing, any person establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such air pollutant achieved under the requirements of paragraph (1), the Administrator shall permit the use of such alternative by the source for purposes of compliance with this section with respect to such pollutant.

(4) Any standard promulgated under paragraph (1) shall be promulgated in terms of an emission standard whenever it becomes feasible to promulgate and enforce such standard in such terms.

(5) Any design, equipment, work practice, or operational standard, or any combination thereof, described in this subsection shall be treated as an emission standard for purposes of the provisions of this chapter (other than the provisions of this subsection).

(July 14, 1955, ch. 360, title I, § 112, as added Dec. 31, 1970, Pub. L. 91-604. § 4(a), 84 Stat. 1685, and amended Aug. 7, 1977, Pub. L. 95-95, title I, §§ 109 (d)(2), 110, title IV, § 401(c), 91 Stat. 701, 703, 791; Nov. 9, 1978, Pub. L. 95-623, § 13(b), 92 Stat. 3458.)

Excerpt from Section 112 of the Clean Air Act (After 1990 Amendments)

(f) Standard to protect health and environment

(1) Report

Not later than 6 years after November 15, 1990, the Administrator shall investigate and report, after consultation with the Surgeon General and after opportunity for public comment, to Congress on—

(A) methods of calculating the risk to public health remaining, or likely to remain, from sources subject to regulation under this section after the application of standards under subsection (d) of this section;

(B) the public health significance of such estimated remaining risk and the technologically and commercially available methods and costs of reducing such risks;

(C) the actual health effects with respect to persons living in the vincinity of sources, any available epidemiological or other health studies, risks presented by background concentrations of hazardous air pollutants, any uncertainties in risk assessment methodology or other health assessment technique, and any negative health or environmental consequences to the community of efforts to reduce such risks; and

(D) recommendations as to legislation regarding such remaining risk.

(2) Emission standards

(A) If Congress does not act on any recommendation submitted under paragraph (1), the Administrator shall, within 8 years after promulgation of standards for each category or subcategory of sources pursuant to subsection (d) of this section, promulgate standards for such category or subcategory if

promulgation of such standards is required in order to provide an ample margin of safety to protect public health in accordance with this section (as in effect before November 15, 1990) or to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect. Emission standards promulgated under this subsection shall provide an ample margin of safety to protect public health in accordance with this section (as in effect before November 15, 1990), unless the Administrator determines that a more stringent standard is necessary to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect. If standards promulgated pursuant to subsection (d) of this section and applicable to a category or subcategory of sources emitting a pollutant (or pollutants) classified as a known, probable or possible human carcinogen do not reduce lifetime excess cancer risks to the individual most exposed to emissions from a source in the category or subcategory to less than one in one million, the Administrator shall promulgate standards under this subsection for such source category.

(B) Nothing in subparagraph (A) or in any other provision of this section shall be construed as affecting, or applying to the Administrator's interpretation of this section, as in effect before November 15, 1990, and set forth in the Federal Register of September 14, 1989 (54 Federal Register 38044).

(C) The Administrator shall determine whether or not to promulgate such standards and, if the Administrator decides to promulgate such standards, shall promulgate the standards 8 years after promulgation of the standards under subsection (d) of this section for each source category or subcategory concerned. In the case of categories or subcategories for which standards under subsection (d) of this section are required to be promulgated within 2 years after

November 15, 1990, the Administrator shall have 9 years after promulgation of the standards under subsection (d) of this section to make the determination under the preceding sentence and, if required, to promulgate the standards under this paragraph.

(3) Effective date

Any emission standard established pursuant to this subsection shall become effective upon promulgation.

(4) Prohibition

No air pollutant to which a standard under this subsection applies may be emitted from any stationary source in violation of such standard, except that in the case of an existing source—

(A) such standard shall not apply until 90 days after its effective date, and

(B) the Administrator may grant a waiver permitting such source a period of up to 2 years after the effective date of a standard to comply with the standard if the Administrator finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

(5) Area sources

The Administrator shall not be required to conduct any review under this subsection or promulgate emission limitations under this subsection for any category or subcategory of area sources that is listed pursuant to subsection (c)(3) of this section and for which an emission standard is promulgated pursuant to subsection (d)(5) of this section.

(6) Unique chemical substances

In establishing standards for the control of unique chemical substances of listed pollutants without CAS

numbers under this subsection, the Administrator shall establish such standards with respect to the health and environmental effects of the substances actually emitted by sources and direct transformation byproducts of such emissions in the categories and subcategories.

Excerpt from Section 301 of the Clean Air Act

Administration

(a) Regulations; delegation of powers and duties; regional officers and employees

(1) The Administrator is authorized to prescribe such regulations as are necessary to carry out his functions under this chapter. The Administrator may delegate to any officer or employee of the Environmental Protection Agency such of his powers and duties under this chapter, except the making of regulations, *subject to section 7607(d)* as he may deem necessary or expedient.

* * * *

APPENDIX F

BENZENE LEAKS
NESHAP REGULATION AND PREAMBLE

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-2538-4]

National Emission Standards for Hazardous Air Pollutants; Benzene Equipment Leaks (Fugitive Emission Sources)

AGENCY: Environmental Protection Agency (EPA).
ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) listed benzene as a hazardous air pollutant under Section 112 of the Clean Air Act on June 8, 1977 (42 FR 29332). A standard was subsequently proposed for benzene fugitive emission sources (46 FR 1165, January 5, 1981). This *Federal Register* notice responds to comments on and promulgates the standards for benzene fugitive emission sources.

EFFECTIVE DATE: June 6, 1984. Under section 307(b)(1) of the Clean Air Act, judicial review of national emission standards for hazardous air pollutants (NESHAP) is available *only* by filing a petition for review in the United States Court of Appeals for the District of Columbia circuit within 60 days of today's publication of these rules. Under section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements. The director of the *Federal Register* approves the incorporation by reference of certain publications in 40 FR effective on June 6, 1984.

ADDRESSES: *Background Information Documents.* The background information documents (BID's) may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. For background information on today's promulgated standard, please refer to "Benzene Fugitive Emissions—Background Information for Promulgated Standards," EPA-450/3-80-032b. The BID for the promulgated standard contains: (1) A summary of all public comments on the proposed standard and the Administrator's response to the comments; (2) a summary of changes to the standard since proposal; and (3) the final environmental impact statement (EIS), which sumarizes the impacts of the standard.

Dockets. Docket No. A-79-27 contains technical information considered in developing the promulgated standard for benzene fugitive emissions. Docket No. OAQPS 79-3 (Part I) contains information considered on the health effects, listing, and regulation of benzene. These dockets are available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section (LE-131), West Tower Lobby, Gallery 1, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT:

For further information concerning the background technical information supporting the promulgated standard, contact Mr. James F. Durham, Chemicals and Petroleum Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5671. For further information on the regulation of benzene and the promulgated standard, contact Mr. Gilbert H. Wood, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Re-

search Triangle Park, North Carolina 27711, telephone number (919) 541-5578.

SUPPLEMENTARY INFORMATION:

Background Information on Health Effects of Benzene

On June 8, 1977, the Administrator announced his decision to list benzene as a hazardous air pollutant under section 112 of the Clean Air Act (42 FR 29332). Supplementary background information regarding the health effects and listing of benzene as a hazardous air pollutant may be obtained from Docket No. OAQPS-79-3 (Part I). A public hearing was held on August 21, 1980, to discuss the health effects and listing of benzene as a hazardous air pollutant. Comments were received and EPA's responses are detailed in the EPA document, "Response to Public Comments on EPA's listing of Benzene Under section 112" (EPA—450/5-82-003).

Summary of the Standard

The standard applies to certain new and existing equipment in benzene service (i.e., equipment containing materials with a benzene concentration of 10 percent or more by weight) except those located in process units that produce benzene or benzene mixtures at coke by-product plants or at plant sites that are designed to produce or use benzene in quantities of 1,000 megagrams per year (Mg/yr) or less. Equipment covered by the standard includes new and existing valves, pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, pipeline flanges, product accumulator vessels, and closed vent systems and control devices used to comply with the standard. The standard includes work practices and other requirements as provided by section 112(e) of the Clean Air Act and discussed in the preamble to the proposed rule (46 FR 1177). Permission to use any alternative means of emission limita-

tion will be granted after a notice is published in the Federal Register and an opportunity for a public hearing.

Valves. A monthly leak detection and repair program is required by the standard for valves in gas or liquid service. However, EPA will allow quarterly monitoring for valves that have been found not to leak for 2 successive months. This is monthly/quarterly leak detection and repair. Leak detection is to be performed with a portable organic vapor analyzer according to Reference Method 21 (see Appendix A of 40 CFR Part 60). If a reading of 10,000 ppm or greater of organic materials is obtained, a leak is detected. Initial repair of the leak must be attempted within 5 days, and the repair must be completed within 15 days.

Since proposal, provisions for difficult-to-monitor and unsafe-to-monitor valves have been added to the standard for valves. For existing valves, the standard has been changed to allow an annual leak detection and repair program for valves that are difficult to monitor. Valves that are difficult to monitor are defined as valves that would require elevating the monitoring personnel more than 2 meters above any permanent available support surface. This means valves that cannot be safely monitored by the use of step ladders could be classified as difficult to monitor.

In addition, some valves are unsafe to monitor. Valves that are unsafe to monitor cannot be eliminated in new or existing units. The final standard has been changed to allow an owner or operator to submit a plan that defines a leak detection and repair program conforming with the routine monitoring requirements of the standard as much as possible, with the understanding that monitoring should not occur during unsafe conditions. Valves that are unsafe to monitor are defined as those valves that could, as demonstrated by the owner or operator, expose monitoring personnel to imminent hazards from temperature, pressure,

or explosive process conditions. EPA expects very few unsafe-to-monitor valves in benzene service.

At proposal, two alternative standards were presented for valves in gas/vapor and liquid service. Both of these alternatives called for 1 year of monthly monitoring to obtain data on which to base the alternative standard. However, since proposal, the two alternative standards have been changed in response to comments concerning the need to collect data.

The first alternative standard specifies a 2 percent limitation as the maximum percent of valves leaking within a process unit, determined by a minimum of one performance test annually. This alterative provides the flexibility of a performance level that could be met by implementing any type of leak detection and repair program and engineering controls chosen at the discretion of the owner or operator. If the results of a performance test show a percentage of valves leaking higher than 2 percent, however, the process unit would not be in compliance with the standard. Finally, if owners or operators determine that they no longer wish to comply with this alternative standard, they must submit a notification in writing to EPA stating that they will comply with the monthly/quarterly leak detection and repair program.

The second alternative standard specifies two statistically-based skip-period leak detection and repair programs. Under skip-period leak detection, an owner or operator can skip from routine monitoring [monthly/quarterly monitoring] to less frequent monitoring after completing a number of consecutive monitoring intervals with performance levels less than 2 percent. This approach provides that the performance level is achieved for each skipped period with better than 90 percent certainty. Based on this skip-period approach, two sets of consecutive periods and fraction of periods skipped were determined for benzene process units. First, after two consecutive quarterly periods with fewer than 2 percent of

valves leaking, an owner or operator may skip to semi-annual monitoring. Second, after five consecutive quarterly periods with fewer than 2 percent of valves leaking, an owner or operator may skip to annual monitoring. This alternative standard also requires that, if a process unit exceeds the 2 percent of valves leaking, the owner or operator must revert to the monthly/quarterly leak detection and repair program. Compliance with this alternative standard would be determined by inspection and review of records.

The delay of repair provisions for valves have been expanded in the final standard. In the proposed standard, delay of repair was allowed where repair is technically or physically infeasible without a process unit shutdown. In addition to the provision already in the proposed standard, several provisions have been added to the final standard. One added provision allows for delay of repair beyond a process unit shutdown for valves when unforeseeable circumstances deplete valves used for repair. Another provision has been added to allow delay of repair for valves if the owner or operator shows that leakage of purged material during repair is greater than the equipment leaks that are likely to result from delay of repair. EPA expects this provision to be used seldom.

A definition of "process unit shutdown" has been added to the standard to avoid extended delays in returning a process unit to production if the unit shuts down briefly due to unforeseen circumstances. Delay of repair beyond an unforeseen process unit shutdown is less than 24 hours in duration. Repair of leaking equipment for which repair has been delayed would be required at the next process unit shutdown.

As part of the delay of repair requirements, EPA is clarifying its intent for spare equipment that does not remain in benzene service. Delay of repair of equipment for which leaks have been detected will be allowed if the equipment is isolated from the process and no longer con-

tains benzene in concentrations greater than 10 percent. The equipment purge must be destroyed or recovered in a system that complies with the requirements discussed in the *Closed-vent systems and control devices* portion of this section of the preamble.

Pumps. A monthly leak detection and repair program is required by the standard for benzene-handling pumps in liquid service. Leak detection is to be performed with a portable organic vapor analyzer according to Reference Method 21. If a reading of 10,000 ppm or greater of organic materials is obtained, a leak is detected. Initial repair of the leak must be attempted within 5 days, and the repair must be completed within 15 days. Delay of repair will be allowed for pumps that cannot be repaired without a process unit shutdown. Delay of repair, up to 6 months after detecting a leak, is also allowed when the plant owner or operator determines that repair of the pump requires using a dual mechanical seal system. Delay of repair is not expected to be needed for most situations, however, because pumps are commonly spared.

At proposal, EPA required a monthly leak detection and repair program for existing pumps but required the installation of dual mechanical seal systems for new pumps. Since proposal, as discussed in the *Selection of the Final Standard* section of this preamble, EPA analyzed the annualized cost of controlling benzene emissions and the resultant emission reduction for each alternative control technique. Based on comparison of costs and emission reductions, including estimates of exposures to benzene, EPA selected the work practice standard (leak detection and repair) for new as well as existing pumps. However, EPA is allowing the use of dual mechanical seal systems in the final standard. If an owner or operator prefers, he or she may comply with the equipment standard. The details or provisions of the equipment standard have not been changed since proposal.

Compressors. The standard for new and existing compressors requires the use of mechanical seals with barrier

fluid systems and controlling degassing vents. The controlling degassing vents must use a closed-vent system and a control device that complies with the requirements as discussed in the *Closed-vent systems and control devices* portion of this section of the preamble. For existing compressors, EPA proposed a monthly leak detection and repair program. Since proposal, EPA reconsidered the selection of the final standard and concluded that the installation of control equipment is the only viable control technique for compressors.

Pressure relief devices. The use of control equipment (rupture disk systems or closed-vent systems to flares) is the basis for the standard for pressure relief devices in gas service. For control techniques that eliminate equipment leaks, such as the use of rupture risk systems, an emission limit measurement for "no detectable emissions" can be established. An instrument reading of less than 500 parts per million by volume (ppmv) above a background concentration based on Reference Method 21 will be used to indicate whether equipment leaks have been eliminated.

The "no detectable emission" limit will not apply to discharges through the pressure relief device during overpressure relief because the function of relief devices in to discharge process fluid, thereby reducing dangerous high pressures within the equipment. The standard specifies, however, that the relief device be returned to a "no detectable emissions" status within 5 days after such a discharge. The standard further requires an initial and annual test to verify the "no detectable emissions" status of the pressure relief devices.

Plant owners or operators may also comply with this standard by connecting pressure relief devices in gas service to a system that complies with the requirements as discussed in the *Closed-vent systems and control devices* portion of this section of the preamble. Since proposal, the use of flares has been allowed as an alternative control device in the final standard. EPA judges that the added

emission reduction achieved by reducing the emissions that occur during overpressure relief offsets the decrease in emission reduction that would occur by allowing 95 percent reduction (level of control required of all control devices) rather than the 100 percent reduction associated with rupture risk systems.

Sampling connection systems. Closed-purge sampling is the required standard for sampling connection systems. Closed-purge sampling connection systems eliminate emissions due to purging by either returning the purge material directly to the process or by collecting the purge in a collection system that is not open to the atmosphere. Collected purge material must be destroyed or recovered in a system that complies with requirements discussed in the *Closed-vent systems and control devices* portion of this section of the preamble.

Since proposal, EPA decided to allow closed-vent vacuum systems connected to a control device and *in-situ* sampling systems in addition to closed-purge sampling. Closed-vent vacuum systems that are connected to a control device extract the sample purge and then reduce emissions from the sample purge by transporting benzene to the control device. If closed-vent vacuum systems are not open to the atmosphere and the system complies with the requirements discussed in the *Closed-vent systems and control devices* portion of this section of the preamble, then their reduction of benzene emissions would be equivalent to the reduction achieved by closed-purge sampling connection systems. *In-situ* sampling systems involve measurement or sampling of process stream conditions without extraction of the sample from the process stream. *In-situ* sampling systems, therefore, result in no emissions of benzene.

Open-ended valves or lines. The standard for open-ended valves or lines requires the use of caps, plugs, or any other equipment that will effect enclosure of the open end. The standard has not changed since proposal. If a second valve is used, the standard requires the upstream

valve to be closed first. After the upstream valve is completely closed, the downstream valve must be closed. This operational requirement is necessary in order to prevent trapping process fluid between the two valves, which could result in a situation equivalent to the uncontrolled open-ended valve or line.

Product accumulator vessels, pipeline flanges, and pressure relief devices in liquid service. The standard for product accumulator vessels effectively requires venting accumulator vessel emissions to a system that complies with the requirements as discussed in the *Closed-vent systems and control devices* portion of this section of the preamble. Flanges and pressure relief devices in liquid service will be excluded from the routine leak detection and repair requirements. However, if leaks are detected from these sources, the same allowable repair interval that applies to valves and pumps will apply.

Closed-vent systems and control devices. Control devices will be used to reduce benzene equipment leaks captured and transported through closed-vent systems. Reference Method 21 will be used to verify that a closed-vent system has been designed and installed properly. At proposal, control devices were required to be either enclosed combustion devices designed to provide a minimum residence line of 0.50 seconds at a minimum temperature of 760°C or vapor recovery systems with an efficiency of 95 percent or greater. Based on review of comments on the proposed standard, EPA concluded that all reasonably designed, existing control devices for organic emissions can achieve a reduction efficiency for benzene of at least 95 percent. EPA, therefore, has not changed the requirements for control devices. EPA has made it clear, however, that an enclosed combustion device with a reduction efficiency of at least 95 percent can be used even if the residence time and minimum temperature requirements are not achieved.

Additionally, EPA decided to allow use of smokeless flares operated under certain conditions in complying with

the control device requirements because EPA believes that destruction efficiencies better than 95 percent can be obtained with properly operated flares. Flares operated within these conditions are considered as alternatives to enclosed combustion devices (incinerators, catalytic incinerators, boilers, process heaters, etc.) and vapor recovery systems (such as carbon adsorbers and condensation units). They may be applied to control emissions from pump seals (or degassing reservoirs), compressor seals (or degassing reservoirs), pressure relief devices, and product accumulator vessels. The conditions include a requirement for the presence of a flame; this can be ensured by monitoring the flare's pilot light with an appropriate heat sensor, such as a thermocouple. The conditions also include requirements for smokeless operation (visible emissions are limited to less than 5 minutes in any 2-hour period) and for the heat content of gases combusted by the flare. The standards for closed vent systems and control devices permit the use of devices that have an efficiency better than 95 percent, including steam-assisted and nonassisted flares designed for and operated with an exit velocity of less than 18 m/sec. EPA has been studying the question of whether additional types of flares will also achieve better than 95 percent efficiency; if so, the Agency will revise the standards accordingly.

Reporting and recordkeeping. The promulgated standard includes reporting provisions requiring semiannual reports of leak detection and repair efforts within a process unit. The amount of reporting and the burden associated with the reporting have been reduced from those in the proposed standard. In particular, the quarterly reporting requirement in the proposed standard has been reduced to semiannual reporting. The burden associated with the recordkeeping requirements has also been reduced since proposal. However, the final standard additionally requires that records be kept of periods when a flare pilot light does not have a flame and that unsafe-to-monitor and difficult-to-monitor valves be identified.

Summary of Impacts of the Standard

The standard applies to certain equipment in benzene service. This equipment is used in the production of benzene and other chemicals and products, such as maleic anhydride, ethanol, and pharmaceuticals. The standard will affect equipment located in more than 200 existing process units and an expected 60 new process units by the final standard.
1985.

The environmental, health, economic, and energy impacts are summarized here and are discussed in greater detail in the BID for the promulgated standard, "Benzene Fugitive Emissions—Background Information for Promulgated Standard," EPA-450/3-80-032b.

Environmental and health impacts. Since the standard was proposed, EPA has revised the baseline emission estimate and the estimate of benzene leaks to the atmosphere that will be reduced by the standard. The final standard will reduce emissions from existing benzene equipment leaks by about 69 percent from the baseline control level, which includes petroleum refinery CTG controls. This percentage reduction represents a decrease in emissions from about 7,920 megagrams of benzene per year (Mg/yr) to about 2,470 Mg/yr for existing equipment leaks of benzene. Implementation of the standard will result in negligible impacts on water quality and solid waste. No noise impact will result.

EPA has also revised the assessment of leukemia risk from exposure to existing equipment leaks of benzene as a result of revised emission estimates, exposure modeling techniques, and the benzene unit risk factor. In its revised estimate, EPA has calculated that the standard will reduce the estimated maximum lifetime risk for the most exposed population from about 1.5×10^{-3} at current (baseline) controls to about 4.5×10^{-4} for existing benzene equipment leaks. The standard will reduce the estimated annual incidence of leukemia (cases per year) for the public

living within 20 kilometers of existing benzene equipment leaks from about 0.45 cases per year at current controls to about 0.14 cases per year. Due to the assumptions that were made in calculating these maximum lifetime risk and leukemia incidence members, there is uncertainty associated with the numbers presented here and elsewhere in this preamble. The use of the risk numbers is discussed in the *Federal Register* notice regarding the regulation of benzene as a hazardous air pollutant.

Cost and economic impacts. Since the standard was proposed, EPA has reanalyzed the cost of controlling benzene equipment leaks and the resultant benzene emission reduction for each type of equipment covered by the standard and for each control technique. In response to comments, EPA considered the costs and emission reductions associated with each type of equipment in selecting the final standard.

For existing equipment the nationwide capital cost for the standard will be about $5.5 million, and the 1985 nationwide annualized cost as a result of the standard will be about $400,000. Because the cost of the standard is mostly offset by the value of the benzene recovered by the standard and, to the extent that the cost is not completely offset, the cost is very small in comparison to the value of the product made by this equipment, product prices will not increase as a result of the standard. Thus, profits and market positions of individual manufacturers would be unchanged.

Energy impacts. The final standard will result in a positive energy impact by conserving benzene and other organic compounds that have an energy value. Implementation of the standard will result in an energy savings of about 10,000 barrels of crude oil in the fifth year of the standard.

New sources. The standard will result in positive environmental and health impacts for new equipment leaks of benzene. The magnitude of these impacts is difficult to determine because it will depend on several factors,

including the location of the new equipment, the number and distribution of people living in the vicinity of the new equipment, and the level of control that would have been used in the absence of the standard. The nationwide capital and 1985 annualized costs for new equipment will depend on the level of control that would have been used in the absence of this standard. These factors cannot be determined definitely before sources are actually constructed. Because EPA recognizes this additional uncertainty in environmental and health impacts, cost and economic impacts, and energy impacts for leaks of benzene from new equipment, these impacts are not presented here. The impacts, however, will be proportionately similar to the impacts for existing sources; that is, if the standard results in less emission reduction for new sources than for existing sources (because fewer new sources would be covered), then the cost of this emission reduction will be proportionately less also.

Public Participation

Prior to proposal of the standard, interested parties were advised by public notice in the *Federal Register* (45 FR 18474, March 21, 1980) of a meeting of the National Air Pollution Control Techniques Advisory Committee to discuss the national emission standard for benzene fugitive emissions recommended for proposal. This meeting was held on April 16, 1980. The meeting was open to the public, and each attendee was given an opportunity to comment on the standard recommended for proposal. The standard was proposed in the *Federal Register* on January 5, 1981 (46 FR 1165). The preamble to the proposed standard discussed the availability of the BID for the proposed standard (EPA-450/3-80-032a), which described in detail the regulatory alternatives considered and the impacts of those alternatives. Public comments were solicited at the time of proposal, and when requested, copies of the BID were distributed to interested parties. To provide interested persons the opportunity for oral presentation of data, views, or argu-

ments concerning the proposed standard, a public hearing was held on July 14, 1981, at Research Triangle Park, North Carolina. The hearing was open to the public, and each attendee was given an opportunity to comment on the proposed standard. The public comment period was extended to September 14, 1981.

EPA received 30 comment letters on the proposed standard and BID. Industry representatives submitted most of the comments. Also commenting were representatives of State and local air pollution agencies and a representative of an environmental group. The comments have been considered carefully and, where determined to be appropriate by EPA, changes have been made to the proposed standard.

EPA published an Additional Information Document (AID) in April of 1982. The AID contains a technical discussion of methodologies and estimates of emissions, emission reductions, and cost associated with control of equipment leaks of organic compounds, including benzene. A notice of the availability of the AID and a request for comments on the AID was published in the *Federal Register* on May 7, 1982 (47 FR 19724). Fourteen letters were received containing comments on the AID. Comments on the AID have been considered carefully, and changes have been made to the technical aspects of EPA's analysis where appropriate.

Significant Comments and Changes to the Proposed Standard

Most of the comment letters contained multiple comments, and many of the comment letters repeated comments contained in other letters. A detailed discussion of these comments and responses can be found in the BID for the promulgated standard, which is referred to in the ADDRESSES section of this preamble. The comments and responses in the BID for the promulgated standard serve as the basis for the revisions that have been made to the standard between proposal and promulgation. The

major revisions to the standard are indicated in the SUMMARY OF THE STANDARD section of this preamble.

The most important comments, in addition to the comments on the listing of benzene, considered by EPA concerned whether benzene fugitive emissions warrant regulation. Benzene fugitive emissions, which are not substantially different from the emissions judged to be significant at proposal, contribute 7,900 Mg/yr; this figure reflects current controls. (EPA adjusted the control level for petroleum refineries in nonattainment areas to reflect controls required by States in accordance with EPA's Control Techniques Guideline (CTG) document. This adjustment reduced emissions, but the reduction was offset to some extent by refinements in emission factors.) Approximately 20 to 30 million people live within 20 kilometers of the 128 plants with these fugitive emissions. These people are exposed to higher levels of benzene than is the general population. Due to the lack of a demonstrated threshold for benzene's carcinogenic effects, these people not only incur a higher benzene exposure but also run greater risk of contracting leukemia due to that exposure.

EPA revised the quantitative risk assessments for this source category based on the updated emissions estimates, the revised risk factor, and the more detailed SAI human exposure model. The lifetime risk of contracting leukemia for the most exposed individuals is estimated to be about 1.5×10^{-3} for benzene fugitive emission sources, and the increased leukemia incidence as a result of exposure to the current fugitive emissions is estimated to be about 0.45 cases per year.

The number of process units emitting benzene fugitive emissions is anticipated to grow from about 240 to 310 units. These new sources would probably increase the number of people exposed to benzene emitted from this source category and increase the estimated leukemia incidence accordingly.

Based on the human carcinogenicity of benzene, the magnitude of benzene fugitive emissions, the estimated ambient benzene concentrations in the vicinity of the plants with fugitive emissions, the proximity of people to these plants, the resulting estimated maximum individual risks and estimated incidence of leukemia cases in the exposed population, the projected increase in benzene emissions as a result of new sources, the estimated reductions in emissions and health risks that can be achieved, and consideration of the uncertainties associated with the quantitative risk estimates (including effects of concurrent exposures to other substances and to other benzene emissions), EPA finds that benzene emissions from benzene fugitive emission sources pose a significant cancer risk and that the establishment of a national emission standard under Section 112 is warranted.

In this preamble, only the major comments concerning the standard for equipment leaks of benzene are addressed. Comments on the need for standards to cover emission sources of benzene (including equipment leaks of benzene) and health effects and risk assessment of exposure to benzene are addressed in detail in the *Federal Register* notice regarding the regulation of benzene as a hazardous air pollutant. Comments on minor issues, such as test methods and procedures, are addressed in detail in the BID for the promulgated standard. This preamble addresses issues concerning selection of the final standard, economic impact of the final standard, and recordkeeping and reporting requirements.

Selection of the Final Standard

EPA selected the appropriate levels of control for the benzene fugitive emissions standard in light of carcinogenic risks and technological and economic factors. EPA is requiring that the source categories selected for regulation, as a minimum, achieve emission levels reflecting best available technology considering costs, energy, and economic impacts (BAT), to control benzene emissions. After selecting BAT, EPA identified a level of control

more stringent than BAT and evaluated the incremental reductions in health risks obtainable against the incremental costs and economic impacts estimated to result from the application of a more stringent alternative. As described in more detail later in this notice, EPA concluded from this evaluation that the estimated risks remaining after the application of BAT to benzene fugitive emission sources are not unreasonable in view of the costs and economic impacts of reducing risks further, and that for this reason, BAT provides an ample margin of safety to protect human health.

Many people commented on the basis for section of the proposed standard. Several commenters questioned the cost effectiveness (cost per unit of emission reduction) and impacts of Regulatory Alternatives III and IV for existing and new equipment in benzene service. Some of the commenters recommended the selection of less stringent regulatory alternatives, and some recommended the selection of a more stringent regulatory alternative. Other commenters stated that selection should be based on the cost and emission reduction impacts for each type of equipment covered by the standard instead of regulatory alternatives.

After considering these comments, EPA selected the final standards for new and existing equipment in benzene service. Selection of the basis of the final standard was a two-step process and was similar to the approach used when the standard was proposed. The first step was the selection of the best available technology (BAT). Best available technology for equipment in benzene service is technology which, in the judgment of the Administrator, is the most effective level of control considering economic, energy, and environmental impacts and any technological problems associated with the retrofitting of existing equipment. After consideration of these impacts for each alternative control technique, one set of control techniques was selected as BAT for equipment in benzene service.

After selecting certain control techniques as BAT, EPA evaluated the estimated health risks remaining after application of BAT to determine if they are unreasonable in view of health risk reductions and cost (economic) impacts that would result if a more stringent level of control were applied. This provides a comparison of the costs and economic impacts of control with the benefits of further risk reduction. The benefits of risk reduction are expressed in terms of the estimated leukemia incidence (cases per year) within 20 kilometers of the equipment covered by the standard and the estimated maximum lifetime risk at the point of maximum exposure. The results of this comparison determine whether, in the judgment of the Administrator, the residual risks remaining after application of BAT are unreasonable. If the risks remaining after application of BAT are judged to be unreasonable, further controls would be required.

The cost of the proposed control techniques for benzene equipment leaks are very small relative to the capital and operating costs of affected process units. As a consequence, none of these control techniques impact the ability of an owner or operator to raise capital or measurably impact product prices or energy requirements. Therefore, EPA selected BAT primarily based on a comparison of costs and emission reduction associated with each alternative control technique. In making this decision, EPA is accepting the suggestions of commenters to consider further cost per unit emission reduction estimates and to consider these estimates for each type of equipment covered by the standard in the selection of BAT. In selecting BAT, EPA initially selected control techniques that achieve the greatest emission reduction with reasonable control costs per megagram of emission reduction. The emission reductions and the average and incremental costs per megagram of benzene and total emissions (including benzene and other volatile organic compounds (VOC)) are summarized in Tables 1 and 2, respectively, for each type of equipment covered by the standard. After initially

selecting one set of control techniques as BAT for each type of equipment covered by the standard, EPA analyzed economic and other impacts of this set of control techniques. To the extent that these impacts were reasonable, the control techniques were selected as BAT and then were used in estimating the risks remaining after application of BAT.

[Table 1. Control Costs per Megagram of Benzene Reduced and Table 2. Control Costs per Megagram of Total Emissions Reduced Omitted in Printing.]

For each type of equipment, the average cost effectiveness of each control technique was calculated based in the net annualized cost and the annual emission reduction from the uncontrolled level. Starting with the most stringent control technique, which achieves the greatest emission reduction of the greatest annualized cost. EPA examined the incremental cost effectiveness between the most stringent control technique and the next less restrictive control technique. The incremental cost effectiveness between any two alternative control techniques was based on the difference in net annualized costs divided by the difference in the annual emission reductions of the alternate control techniques. If the incremental cost in comparison to the incremental emission reduction is judged unreasonable, then the next increment is examined until a control technique with a reasonable incremental cost in comparison to the incremental emission reduction is available.

Costs per megagram of emission reduction (average and incremental) were calculated in terms of total emissions (benzene and other VOC) as well as benzene alone. Control of benzene equipment leaks results in the destruction of other organic compounds (mainly VOC) as well as benzene; therefore, control of VOC is an added benefit of controlling benzene. In making decisions about the acceptability of the cost of emission reductions achieved by a control technique, it is appropriate to consider the VOC as well as the benzene emission reductions. However, VOC emission reductions were considered only in

the sense that VOC emission reductions can add weight to selecting a control technique as BAT.

The basis for selecting BAT for each type of equipment in benzene service is discussed below. It should be noted that the control costs for each type of equipment do not represent the actual amounts of money spent at any particular plant site. The cost of emission reduction systems will vary according to the chemical product being produced, production equipment, plant layout, geographic location, and company preferences and policies. However, these costs and emission reductions are considered typical of control techniques for benzene equipment leaks and can be used in selecting the level of control to be required by the standard.

Valves. EPA first considered the use of sealed bellows valves. However, a requirement for sealed bellows valves is considered unreasonable. The incremental cost for the use of sealed bellows valves compared to a monthly leak detection and repair program for valves is about $49 million/yr for existing valves and results in an emission reduction of about 1,100 Mg/yr of benzene; this represents Furthermore, the use of sealed bellows valves results in an incremental cost effectiveness of about $44,000/Mg. an incremental emission reduction of 1,870 Mg/yr of total emissions (including benzene and other VOC). Because the incremental cost effectiveness ($44,000/Mg of benzene) of this control technique is relatively high and because the additional emission reduction of VOC does not add enough weight to convince EPA that the costs are reasonable, EPA decided not to require the use of sealed bellows valves.

Next, EPA considered several leak detection and repair programs for valves. The leak detection and repair programs differed in the monitoring frequency that could be implemented. As Tables 1 and 2 show, all of the monitoring programs would result in net credits because the value of recovered product resulting from implementa-

tion of each program is greater than the cost of each program. The largest emisssion reduction is associated with the monthly program. The incremental cost for a monthly program compared to a quarterly program is about $48,000/yr for existing valves and results in an incremental benzene emission reduction of about 400 Mg./yr; this represents an incremental cost effectiveness of about $120/Mg of benzene. Because EPA considers the incremental cost effectiveness associated with the monthly program to be reasonable, EPA selected a monthly leak detection and repair program as BAT for valves.

Pumps. The costs and emission reductions associated with the control of pumps were determined for three leak detection and repair programs and the use of dual mechanical seal systems. The incremental cost associated with the use of dual mechanical seal systems (compared to the monthly program) on existing pumps is about $3.3 million/yr and results in an incremental emission reduction of about 220 Mg/yr of benzene; this represents an incremental cost effectiveness of $15,000/Mg. Furthermore, the use of dual mechanical seal systems reduces an incremental 380 Mg/yr of total emissions (including benzene and other VOC). Because the incremental cost effectiveness ($15,000/Mg of benzene) is relatively high and because the additional emission reduction of VOC does not add enough weight to convince EPA that the costs are reasonable, EPA decided not to require the use of dual mechanical seal systems.

Next, EPA considered leak detection and repair programs for pumps. Monthly and quarterly leak detection and repair programs both result in net annual savings. The annual program results in a cost of about $250,000/yr for a benzene emission reduction of about 290 Mg/yr; this represents a cost effectiveness of about $870/Mg of Benzene. EPA decided not to select an annual program as BAT because it results in higher costs and lower emission reductions in comparison to either a

monthly program or a quarterly program. The monthly program achieves a higher degree of control than the quarterly program at a slightly lower credit. The monthly program (compared to the quarterly program) results in a savings and an incremental emission reduction of about 180 Mg/yr of benzene; this represents an incremental cost effectiveness of essentially zero for existing pumps in benzene service. Because EPA considers the incremental cost effectiveness associated with monthly monitoring of pumps reasonable, monthly leak detection and repair was selected as BAT for pumps.

Compressors. One control technique is considered viable for compressors in benzene service—the installation of equipment such as control of the barrier fluid system. The installation of control equipment results in an emission reduction of about 3.5 Mg/yr per compressor at a savings in cost for each compressor. The control technique results in a savings because the value of product retained by controlling the barrier fluid system exceeds the cost of the control equipment. Since this cost is reasonable, control equipment was selected as BAT for compresssors.

For existing compressors, EPA proposed a monthly leak detection and repair program. At proposal, EPA selected, as the basis of the standard for existing pumps and compressors, a monthly leak detection and repair program because some existing pumps could not be reasonably retrofitted with dual mechanical seal systems and because the cost of retrofitting compressors and replacing pumps was considered exorbitant in light of the resulting emissions reductions. Since proposal, EPA has concluded that the effectiveness of a leak detection and repair program for compressors in benzene service would be negligible. Also, as requested by commenters, EPA has analyzed compressors separately from pumps. This analysis yields the cost and emission reduction estimates above. EPA has thus concluded that control equipment is reason-

able for existing compressors and, therefore, selected it as BAT for existing compressors as well as new compressors.

Pressure relief devices. The annualized costs and emission reductions associated with monthly and quarterly leak detection and repair programs and with the use of control equipment (rupture disks and flares) were determined for pressure relief devices in gas service. As Tables 1 and 2 show, both the quarterly and monthly leak detection and repair programs are less expensive than installation of equipment controls, but they result in lower emission reductions. These programs result in an incremental cost effectiveness of about $300/Mg of benzene for the monthly program (compared to the quarterly program) and a credit for the quarterly program. Equipment controls would result (compared to a monthly program) in incremental emission reductions of about 90 Mg/yr of benzene and an incremental cost of about 150,000/yr. This reflects an incremental cost effectiveness of about $1,700/Mg. Because EPA considers the incremental cost effectiveness of equipment controls reasonable, equipment controls were selected as BAT for pressure relief devices.

Open-ended lines, sampling connection systems, and product accumulator vessels. EPA considered caps or closures as the control technique for the standard for open-ended lines. Costs of $430/Mg and $470/Mg of benzene are reasonable for controlling equipment leaks of benzene from new and existing open-ended lines, respectively. EPA selected caps or closures as BAT for open-ended lines.

EPA considered closed-purge sampling as the control technique for the standard for sampling systems. Costs of $430/Mg and $900/Mg of benzene are reasonable for controlling equipment leaks of benzene from new and existing sampling systems, respectively. EPA selected closed-purge sampling as BAT for sampling systems.

EPA considered closed-vent systems connected to a control device as the control technique for the final stand-

ard for product accumulator vessels. For existing units in benzene service, the installation of closed-vent systems connected to a control device will result in a nationwide net annual cost of $10,300 and an annual emission reduction of about 100 Mg of benzene; this represents a cost effectiveness of about $100/Mg. Since the cost associated with this control technique is reasonable, EPA selected closed-vent systems as BAT for product accumulator vessels.

New sources. Emission reductions and costs for new sources are similar to those for existing sources. If the standard results in less emisssion reduction for new sources (because fewer new sources would be covered), then the cost of the emission reduction for new sources will be less. However, as seen in Tables 1 and 2, the costs that are unreasonable for existing sources are also unreasonable for new sources; therefore, BAT for new sources is the same as BAT for existing sources.

Economic impact considerations of BAT. As mentioned above, once BAT was identified for each type of equipment covered by the standard, EPA analyzed the economic impact of the initial set of BAT control techniques. As a result and as explained in the next section of this preamble, EPA concluded that the control techniques initially selected as BAT have reasonable economic impacts. In addition, EPA has also concluded that other impacts, environmental and energy, associated with these control techniques are reasonable. Thus, they were selected as BAT for equipment in benzene service.

Selection of the final standards. After selecting certain control techniques as BAT (those identified above), EPA evaluated the estimated health risks remaining after application of BAT to determine if they are unreasonable in view of health risk reductions and cost (economic) impacts that would result if a more stringent level of control were applied. Because the most stringent, viable control technique for each type of equipment covered by the

standard is already selected for all types of equipment except for valves and pumps, EPA identified a more stringent level of control by reviewing the control techniques for valves and pumps. The more stringent level of control used for this analysis includes the use of dual mechanical seal systems on pumps in addition to the requirements selected as BAT. This control technique was selected for analysis because it adds the next most cost-beneficial control technique. Thus, if EPA decided not to require this control technique in addition to those control techniques selected as BAT, then EPA would not require less cost-beneficial control techniques, such as sealed bellows valves.

Health and cost impacts were first examined for existing equipment covered by the standard to determine whether a more stringent level of control should be required. Requiring a more stringent level of control instead of BAT would reduce estimated leukemia incidence within 20 kilometers of the equipment covered by the standard from about 0.14 cases per year to about 0.13 cases per year for existing equipment. It would reduce the estimated maximum lifetime risk at the point of maximum exposure from about 4.5×10^{-4} to about 4.2×10^{-4}. Requiring the more stringent level of control rather than BAT would increase capital cost from $5.5 million to $19.5 million and would increase 1985 net annualized costs from $400,000 to a cost of $3.7 million for existing equipment. Because of the relatively small health benefits to be gained with the additional costs of requiring the more stringent level of control instead of BAT for existing equipment, EPA considers the risks remaining after application of BAT to existing equipment not to be unreasonable. For this reason, EPA judged the level of control selected as BAT to provide an ample margin of safety and decided not to require a more stringent level of control than BAT for existing equipment.

Health and cost impacts were next examined for new equipment covered by the standard to determine whether

a more stringent control level should be required. As with existing equipment, EPA considered the use of dual mechanical seal systems on pumps as the more stringent control level that is next most cost-beneficial. Thus, if EPA decides not to require the use of these seals, then EPA would not require less cost beneficial control technologies, such as sealed bellows valves. Requiring the more stringent level of control—the use of dual mechanical seals on pumps in addition to BAT—could reduce estimated leukemia incidence within 20 kilometers of the equipment covered by the standard from about 0.034 cases per year to about 0.032 cases per year for new equipment. It would reduce the estimated maximum lifetime risk at the point of maximum exposure from about 4.5×10^{-4} to about 4.2×10^{-4}. Requiring the more stringent level of control rather than BAT would increase capital cost from $1.4 million to $5.1 million and net annualized costs of $100,000 to $900,000 for new equipment. Because of the relatively small health benefits to be gained with the additional costs of requiring the more stringent level of control instead of BAT for new equipment, EPA considers the risks remaining after application of BAT to new equipment not to be unreasonable. For this reason, EPA judged the level of control selected as BAT to provide an ample margin of safety and decided not to require a more stringent level of control than BAT for new equipment.

Economic Impacts of the Final Standard

The cost of the proposed standard is discussed in Chapter 8 of the BID for the proposed standard, and economic impacts are discussed in Chapter 9. Changes made to the standard since proposal make the annualized cost of the final standard smaller than the annualized cost for the proposed standard. The 1985 net annualized cost of the final standard is $400,000 for existing units and $100,000 for new units. The BID for the proposed standard concludes that any potential price increases resulting from

imposition of the proposed standard would be well under 1 percent and that the profits and market positions of individual manufacturers would not be changed. In view of the lower cost of the final standard, these conclusions can be underscored.

Comments and responses in this section are addressed in three categories: impacts on small facilities, cost effectiveness, and benefit-cost considerations. This categorization is not rigid because some comments are quite broad.

Impacts on small plants. This subsection addresses two principal concerns: the effect of the standard on small businesses, and the application of the standard to small process units and to process units that use minor amounts of benzene or that use benzene intermittently.

The Regulatory Flexibility Act (Pub. L. 96-354, September 19, 1980) directs Federal agencies to pay close attention to minimizing any potentially adverse impacts of a standard on small businesses, small governments, and small organizations. Accordingly, EPA has reviewed the final standard in accordance with the Regulatory Flexibility Act. This standard will have no known effects on small governments and small organizations. A small business in the benzene-using industries generally is one that employs fewer than 750 persons. This level was set by the Small Business Administration (SBA) as a criterion for extending SBA loans and related assistance (13 CFR Part 121. Schedule A). The definition applies to firms that manufacture cyclic crudes and cyclic intermediates, pharmaceuticals, and many other chemicals. The BID for the proposed standard lists 77 existing companies that may be affected by the standard. Most of these companies manufacture cyclic crudes and many other chemicals. With the possible exception of two companies, all of these firms either employ more than 750 persons, or are subsidiaries of large firms. To the extent these two companies are small businesses, the impacts of the standard will be few and minor. Because the standard is expected to result

in small annualized costs, EPA concluded that there will be no adverse impacts on firms regardless of whether they are a small business or not.

One commenter felt that the leak detection and repair requirements would impose substantial costs on small-volume users of benzene with no appreciable benefit to public health. According to the commenter, small-volume pipeline systems at pharmaceutical plants may contain several hundred valves that would need to be monitored monthly when in benzene service. The commenter added that the economic and administrative burden of complying with the standard would be heavy for small-volume users, as compared to large benzene production units, in proportion to the level of equipment leaks from such facilities.

As discussed in section 2.8.1 of the BID for the promulgated standard, EPA is exempting from the standard equipment at plant sites that are designed to produce or use 1,000 Mg/yr or less of benzene. This cutoff is based on the amount of equipment in a process unit and relates this amount to a design production rate. The 1,000 Mg/yr exemption would exclude most research facilities, pilot plants, and intermittent users of benzene from the standard.

The possibility that pharmaceutical operations could be adversely affected by the standard is very small. This is true for several reasons. First, most pharmaceutical plants use very little benzene. According to estimates contained in *Market Input/Output Studies—Benzene Consumption as a Solvent* (EPA-560/6-77-034, October 1987, p. 41), 1978 benzene consumption by pharmaceutical manufacturers was about 0.72 Gg. No companies consumed more than 1,000 Mg/yr in 1978. The commenter states that they consumed about 325 Mf/yr during 1981. Thus, it is unlikely that pharmaceutical operations would be affected by the standard because the final standard exempts equipment at plant sites that are designed to produce or use

1,000 Mg/yr or less of benzene. Second, benzene consumption by the pharmaceutical industry is declining rapidly. The market input/output study just noted estimates that consumption declined from 2.14Gg in 1976 to 0.72 Gg in 1978, a decline of about 66 percent over the 2-year period. Third, the number of companies using benzene has also declined and is expected to continue to fall. For the 2-year period 1976 to 1978, the study estimates that the number of pharmaceutical companies using benzene declined from 10 to 5. And finally, even though pharmaceutical operations that are designed to produce or use benzene in excess of 1,000 Mg/yr are subject to the standard, they have substantial equipment inventories in benzene service, and, therefore, emit benzene in enough quantity to warrant coverage by the final standard. EPA has reviewed the cost for these operations and has concluded that the cost is reasonable.

Use of cost effectiveness. Commenters felt that EPA had not selected the most cost-effective alternative as the basis for the proposed standard. One commenter said that industry's experience in air pollution abatement control programs has led it to conclude that capital costs in excess of $3,000/Mg are not cost effective and should be rejected unless the other alternatives do not substantially achieve the necessary degree of control. The commenter concluded that SOCMI data indicate that the cost effectiveness is definitely higher than the industry guideline of $3,000/Mg.

Selection of BAT was based, in response to these commenters, on an examination of the incremental cost effectiveness among various control techniques for each type of equipment covered by the standard. Whether to require more restrictive control than BAT is based on judging the risks remaining after BAT is applied and the cost and other impacts of reducing these risks. Since proposal, EPA has selected a less restrictive standard than the standard proposed in January 1981; consequently, the cost associated with the standard has decreased.

EPA based emission estimates on refinery emission factors rather than on SOCMI emission factors because recent benzene-specific emission data from refineries and chemical plants are more similar to refining units than to SOCMI units. Therefore, the commenter's conclusion that SOCMI data (discussed in "Fugitive Emission Sources of Organic Compounds—Additional Information on Emissions, Emission Reductions, and Costs," EPA-450/3-82-010) indicate that the cost effectiveness is higher than the industry guideline of $3,000/Mg is not based on the same emission estimates used by EPA. Also in contrast to the commenter, EPA bases cost effectiveness of a standard on net annualized costs rather than on capital costs. It is unclear how the commenter estimated what they called "operating costs." Using 1985 net annualized costs, however, the overall cost effectiveness for the standard is reasonable ($77/Mg of benzene).

Another commenter felt that cost effectiveness dictates that Alternative IV at a minimum, or preferably Alternative V, should have been selected instead of Alternative III in order to fulfill the mandate of Section 112. This judgment is based on the commenter's observation that the net price increase would be less than one-fourth of 1 percent in benzene prices for Alternative IV and less than 4 percent for Alternative V. The commenter considered this a "trivial price to pay for saving additional lives," noting that, in rulemaking on the vinyl chloride standard in 1975, EPA decided that a price impact as high as 10 percent would have been acceptable. The commenter added that cost estimates are usually exaggerated, and firms often develop innovative, less costly compliance techniques.

EPA has selected the final standard after considering whether the risk that remains after application of BAT warrants the incremental cost of additional control. In analyzing the cost of the standard, EPA has made reasonable attempts to ensure that the cost is not underestimated.

Even though industry sometimes may develop less costly compliance techniques, EPA considers its cost estimates reasonable. Based on these cost estimates, EPA judges that the reduction in risk that remains after application of BAT does not warrant the incremental cost of additional control.

Reporting Requirements

One commenter felt that the reporting requirements are purely for the ease of enforcement purposes, for data collection purposes, and require the submittal of duplicate information. The commenter suggested that EPA either delete the requirements or justify the need for the routine reporting requirements in determining compliance with the standard. Other commenters recognized the need for reports but suggested changes to the requirements. One commenter suggested that after submitting the initial report, plants should report only changes in the number of valves or leaks detected and repaired. Other commenters recommended that only leaks not repaired should be reported quarterly and that reporting the number of valves in each process unit is unnecessary since the number rarely changes. One of the commenters added that records of details of unsuccessful repair attempts, while possibly of interest to the owner or operator, should not be made a reporting requirement.

Effective enforcement of standards, such as this one, is important. In doing this, public officials must implement enforcement programs that are efficient in order to reduce the cost of enforcement. Reporting requirements are very helpful for effective and efficient enforcement of the standard. Contrary to what one commenter suggests, EPA is not establishing reporting requirements for the purpose of data collection and has reviewed the requirements to reduce possibly duplicative requirements. Reports will be used in a meaningful manner in conjunction with records and inspections to enforce the standard.

Reporting is an effective mechanism for reducing the cost of enforcement because reports reduce the amount of time required to conduct inspections and make it possible to reduce the number of inspections conducted by enforcement personnel. In response to comments, however, the standard was changed to require semiannual rather than quarterly reports since proposal. Semiannual records cost less to industry than quarterly reports, and they better indicate to enforcement personnel the efforts of plants to control equipment leaks than quarterly reports. Thus, EPA changed the reporting frequency from quarterly to semiannual.

Also, in response to the comments on reporting requirements, EPA reduced the amount of information that must be reported by the plant owner or operator. The information required in reports is the same information that a plant manager would likely want to evaluate his or her program. The report will include the number of leaks that occurred within the process unit during the reporting period, the number of leaks that could not be repaired within 15 days, and the general reasons for unsuccessful or delay of repair past the 15-day period. Since no reporting format is required by the standard, reports required by other regulations may simply be photocopied and submitted in compliance with the standard for equipment leaks of benzene as long as the report satisfies the informational requirements of § 61.247.

The requirement to report reasons for unsuccessful or delay of repair is necessary to allow EPA to assess whether the owner or operator is making reasonable attempts at repair and understands the workings of the standard. EPA expects that delays will occur only because repair would result in process unit shutdown. Such delays can be readily explained by the owner or operator. Since EPA does not expect many of these delays to occur, EPA considers reporting the reasons for them to be reasonable. The requirement to report the number of

leaks found will assist EPA in determining whether the number of leaks not repaired within 15 days indicates reasonable attempts at repair. EPA will gauge the significance of the number of leaks not repaired within 15 days in relation to the number of leaks found.

The requirements in the final standard involve recordkeeping along with reporting. This provides enforcement of the standard in an effective and efficient manner. It should fit well with management of the standard by plant personnel. The recordkeeping requirements are the minimum that could be implemented without precluding the possibility of enforcing the standard. The recordkeeping requirements are essentially the same as those proposed and reflect a level of documentation that plant personnel would require to evaluate implementation of the standard. Without retrospective data, inspections would be useless and reporting would be impossible. In the proposed standards, EPA included a requirement to report leak location and I.D. number. This would have allowed EPA to determine whether certain equipment leaks of benzene in a plant were causing repeated problems. However, in order to reduce reporting requirements for industry and to reduce EPA review requirements, EPA has decided to eliminate leak location and I.D. number from the reporting requirements.

During the first 2 years of the program, the average annual burden of reporting and recordkeeping to industry would be about 20 person-years. The burden is distributed among about 240 process units and, on an annual basis, represents about 1 person-month per process unit. Over the same period, the average annual burden of reporting, recordkeeping, and inspections to EPA would be about 10 person-years. This program provides a reasonable level of compliance monitoring.

Incorporation of Volatile Hazardous Air Pollutant Standards

Other standards for volatile hazardous air pollutants (VHAP), if established, will likely be similar to the standard selected by EPA for equipment leaks of benzene. [This will occur unless, for a specific VHAP, BAT is different, or EPA selects a control level associated with a technology more stringent thant BAT.] Subpart V (40 CFR Part 61) is being promulgated as requirements for equipment leaks of VHAP. Subpart J, which promulgates the specific standard for equipment leaks of benzene, refers to Subpart V as the substantive requirements for all the sources covered by Subpart J. Standards for other VHAP, if proposed, would use Subpart V as a general guideline for the standard for equipment leaks of the VHAP. The technology selected as the basis for Subpart J would be used as the basis for the analyses of other VHAP. This provides an extra degree of certainty for public commenters and an effective mechanism to incorporate appropriate technological changes to all standards for equipment leaks of VHAP.

Docket

The docket is an organized and complete file of all the information considered by EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to identify and locate documents readily so that they can effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and final standard EPA responses to significant comments, the contents of the docket will serve as the record in case of judicial review, except for interagency review materials [section 307(d)(7)(A)].

Miscellaneous

The effective date of this regulation is June 6, 1984. Section 112 of the Clean Air Act provides that national

emission standards for hazardous air pollutants become effective upon promulgation and apply to all existing and new sources.

As prescribed by section 112, promulgation of this standard was preceded by the Administrator's determination that benzene presents a significant carcinogenic risk to human health and is, therefore, a hazardous air pollutant as defined in section 112(a)(1) of the Act. Benzene was added to the list of hazardous air pollutants on June 8, 1977. In accordance with section 117 of the Act, publication of this promulgated standard was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. In addition, members of the benzene task group of the Interagency Regulatory Liaison Group (IRLG), representing the EPA the OSHA, the Food and Drug Administration, and the Consumer Product Safety Commission, have met (when the IRLG existed) and reviewed the standard to ensure that each rule is jointly understood and is consistent with their programs.

An economic impact assessment was prepared for the regulation and for other regulatory alternatives. The economic impact assessment for the standard is included in the BID for the proposed and promulgated standard.

The Paperwork Reduction Act (PRA) of 1980 (Pub. L. 96-511) requires clearance from the Office of Management and Budget (OMB) of reporting and recordkeeping requirements that qualify as an "information collection request" under the PRA, which affect 10 or more plants for the standard. OMB is currently clearing information collection requests for a period of 2 years. For the purposes of OMB's review, an analysis of the burden associated with the reporting and recordkeeping requirements of this regulation has been made. During the first 2 years of this regulation, the average annual burden of the reporting and recordkeeping requirements for the benzene

fugitive standard would be about 20 person-years, based on an average of about 240 process units per year.

Information collection requirements associated with this regulation (Subpart A and Subpart J of Part 61) have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*, and have been assigned OMB control number 2060-0068.

Under Executive Order 12291, the EPA is required to judge whether this regulation is a "major rule" and therefore subject to certain requirements of the Order. The EPA has determined that this regulation will result in none of the adverse economic effects set forth in Section 1 of the Order as grounds for finding a regulation to be a "major rule." This regulation is not a major because: (1) Nationwide annual compliance costs are not as great as the threshold of $100 million; (2) the standard does not significantly increase prices or producton costs; and (3) the standard does not cause significant, adverse effects on domestic competition, employment, investment, productivity, innovation, or competition in foreign markets.

This regulation was submitted to the OMB for review as required by Executive Order 12291. Any comments from the OMB to the EPA and any EPA response to those comments are included in Docket No. A-79-27 (benzene fugitive). The docket is available for public inspection at the EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460.

The Regulatory Flexibility Act of 1980 requires that adverse effects of all Federal regulations upon small businesses be identified. According to current Small Business Administration guidelines, a small business that manufactures cyclic crudes and cyclic intermediates, pharmaceuticals, and many other chemicals is one that has 750 employees or fewer. Currently, very few of the businesses

in the existing industry employ fewer than 750 people. Even if facilities owned by small businesses do become subject to the standard, none will be affected adversely. This conclusion is based on the fact that, in doing the economic analysis for the benzene fugitives standard, the price increase and profitability impacts have been estimated from the perspective of the smaller process units in operation. Therefore, the finding that the annualized cost of the standard will be very small (about $2,000/yr) for units affected by the standard accurately reflects the impacts for benzene fugitive facilities owned by small businesses.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this rule will not have a significant economic impact on a substantial number of small entities.

List of Subjects in 40 CFR Part 61

Asbestos, Beryllium, Hazardous substances, Mercury, Reporting and recordkeeping requirements, Vinyl chloride.

Dated: May 23, 1984.
William D. Ruckelshaus.
Administrator.

PART 61—[AMENDED]

40 CFR Part 61 is amended by adding Subparts J and V and by adding three subparagraphs to paragraph (a) of § 61.18 as follows:

1. By adding Subparts J and V to 40 CFR Part 61 as follows:

Subpart J—National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene

Sec.
61.110 Applicability and designation of sources.
61.111 Definitions.
61.112 Standards.
61.113-61.119 [Reserved].

* * * *

Subpart V—National Emission Standard for Equipment Leaks (Fugitive Emission Sources)

Sec.

61.240 Applicabiilty and designation of sources.
61.241 Definitions.
61.242-1 Standards: General.
61.242-2 Standards: Pumps.
61.242-3 Standards: Compressors.
61.242-4 Standards: Pressure relief devices in gas/vapor service.
61.242-5 Standards: Sampling connection systems.
61.242-6 Standards: Open-ended valves or lines.
61.242-7 Standards: Valves.
61.242-8 Standards: Pressure relief devices in liquid service and flanges and other connectors.
61.242-9 Standards: Product accumulator vessels.
61.242-10 Standards: Delay of repair.
61.242-11 Standards: Closed-vent systems and control devices.
61.243-1 Alternative standards for valves in UHAP Service—allowable percentage of valves leaking.
61.243-2 Alternative standards for valves in UHAP service—skip period leak detection and repair.
61.244 Alternative means of emission limitation.
61.245 Test methods and procedures.
61.246 Recordkeeping requirements.
61.247 Reporting requirements.

Authority: Sections 112 and 301(a) of the Clean Air Act, as amended [42 U.S.C. 7412, 7601(a)], and additional authority as noted below.

Subpart J—National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene

§ 61.110 Applicability and designation of sources.

(a) The provisions of this subpart apply to each of the following sources that are intended to operate in benzene service: pumps, compressors, pressure relief devices, sampling connections, systems, open-ended valves or lines,

valves, flanges and other connectors, product accumulator vessels, and control devices or systems required by this subpart.

(b) The provisions of this subpart do not apply to sources located in coke by-product plants.

(c)(1) If an owner or operator applies for one of the exemptions in this paragraph, then the owner or operator shall maintain records as required in § 61.246(i).

(2) Any equipment in benzene service that is located at a plant site designed to produce or use less than 1,000 megagrams of benzene per year is exempt from the requirements of § 61.112.

(3) Any process unit (defined in § 61.241) that has no equipment in benzene service is exempt from the requirements of § 61.112.

(d) While the provisions of this subpart are effective, a source to which this subpart applies that is also subject to the provisions of 40 CFR Part 60 only will be required to comply with the provisions of this subpart.

§ 61.111 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act, in Subpart A of Part 61, or in Subpart V of Part 61, and the following terms shall have the specific meanings given them:

"In benzene service" means that a piece of equipment either contains or contacts a fluid (Liquid or gas) that is at least 10 percent benzene by weight as determined according to the provisions of § 61.245(d). The provisions of § 61.245(d) also specify how to determine that a piece of equipment is not in benzene service.

"Semiannual" means a 6-month period; the first semiannual period concludes on the last day of the last month during the 180 days following initial startup for new sources; and the first semiannual period concludes on the last day of the last full month during the 180 days after June 6, 1984 for existing sources.

§ 61.112 Standards.

(a) Each owner or operator subject to the provisions of this subpart shall comply with the requirements of Subpart V of this part.

(b) An owner or operator may elect to comply with the requirements of § 61.243-1 and § 61.243-2.

(c) An owner or operator may apply to the Administrator for a determination of an alternative means of emission limitation that achieves a reduction in emissions of benzene at least equivalent to the reduction in emissions of benzene achieved by the controls required in this subpart. In doing so, the owner or operator shall comply with requirements of § 61.244.

§ 61.113-61.119 [Reserved]

* * * *

Subpart V—National Emission Standard for Equipment Leaks (Fugitive Emission Sources)

§ 61.240 Applicability and designation of sources.

(a) The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, flanges and other connectors, product accumulator vessels, and control devices or systems required by this subpart.

(b) The provisions of this subpart apply to the sources listed in paragraph (a) after the date of promulgation of a specific subpart in Part 61.

(c) While the provisions of this subpart are effective, a source to which this subpart applies that is also subject to the provisions of 40 CFR Part 60 only will be required to comply with the provisions of this subpart.

§ 61.241 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act, in Subpart A of Part 61, or in specific subparts of Part 61; and the following terms shall have specific meaning given them:

"Closed-vent system" means a system that is not open to atmosphere and that is composed of piping, connections, and, if necessary, flow-inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device.

"Connector" means, flanged, screwed, welded, or other joined fittings used to connect two pipe lines or a pipe line and a piece of equipment.

"Control device" means an enclosed combustion device, vapor recovery system, or flare.

"Double block and bleed system" means two block valves connected in series with a bleed valve or line that can vent the line between the two block valves.

"Equipment" means each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, flange or other connector, product accumulator vessel in VHAP service, and any control devices or systems required by this subpart.

"First attempt at repair" means to take rapid action for the purpose of stopping or reducing leakage of organic material to atmosphere using best practices.

"In gas/vapor service" means that a piece of equipment contains process fluid that is in the gaseous state at operating conditions.

"In liquid service" means that a piece of equipment is not in gas/vapor service.

"*In-situ* sampling systems" means nonextractive samplers or in-line samplers.

"In vacuum service" means that equipment is operating at an internal pressure which is at least 5 kilopascals (kPa) below ambient pressure.

"In VHAP service" means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of § 61.245(d). The provisions of § 61.245(d) also specify how to determine that a piece of equipment is not in VHAP service.

"In VOC service" means, for the purpose of this subpart, that (a) the piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight (see 40 CFR 60.2 for the definition of volatile organic compound or VOC and 40 CFR 60.458(d) to determine whether a piece of equipment is not in VOC service) and (b) the piece of equipment is not in liquid service as defined in 40 CFR 60.481.

"Open-ended valve or line" means any valve, except pressure relief valves, having one side of the valve seat in contact with process fluid and one side open to atmosphere, either directly or through open piping.

"Pressure release" means the emission of materials resulting from the system pressure being greater than the set pressure of the pressure relief device.

"Process unit" means equipment assembled to produce a VHAP or its derivatives as intermediates or final products, or equipment assembled to use a VHAP in the production of a product. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient product storage facilities.

"Process unit shutdown" means a work practice or operational procedure that stops production from a process unit or part of a process unit. An unscheduled work practice or operational procedure that stops production from a process unit or part of a process unit for less than 24 hours is not a process unit shutdown. The use of spare equipment and technically feasible bypassing of equipment without stopping production are not process unit shutdowns.

"Product accumulator vessel" means any distillate receiver, bottoms receiver, surge control vessel, or product separator in VHAP service that is vented to atmosphere either directly or through a vacuum-producing system. A product accumulator vessel is in VHAP service if the liquid or the vapor in the vessel is at least 10 percent by weight VHAP.

"Repaired" means that equipment is adjusted, or otherwise altered, to eliminate a leak as indicated by one of the following: an instrument reading of 10,000 ppm or greater, indication of liquids dripping, or indication by a sensor that a seal or barrier fluid system has failed.

"Semiannual" means a 6-month period; the first semiannual period concludes on the last day of the last month during the 180 days following initial startup for new sources; and the first semiannual period concludes on the last day of the last full month during the 180 days after the effective date of a specific subpart that references this subpart.

"Sensor" means a device that measures a physical quantity or the change in a physical quantity, such as temperature, pressure, flow rate, pH, or liquid level.

"Volatile Hazardous Air Pollutant" or "VHAP" means a substance regulated under this subpart for which a standard for equipment leaks of the substance has been proposed and promulgated. Benzene is a VHAP.

§ 61.242-1 Standards: General.

(a) Each owner or operator subject to the provisions of this subpart shall demonstrate compliance with the requirements of § 61.242-1 to § 61.242-11 for each new and existing source as required in 40 CFR 61.05, except as provided in § 61.243 and § 61.244.

(b) Compliance with this subpart will be determined by review of records, review of performance test results, and inspection using the methods and procedures specified in § 61.245.

(c)(1) An owner or operator may request a determination of alternative means of emission limitation to the requirements of §§ 61.242-2, 61.242-3, 61.242-5, 61.242-7, 61.242-8, 61.242-9 and 61.242-11 as provided in § 61.244.

(2) If the Administrator makes a determination that a means of emission limitation is at least a permissible alternative to the requirements of §§ 61.242-2, 61-242-3, 61-242-5, 61.242-6, 61.242-7, 61.242-8, 61.242-9 or 61.242-11, an owner or operator shall comply with the requirements of that determination.

(d) Each piece of equipment to which this subpart applies shall be marked in such a manner that it can be distinguished readily from other pieces of equipment.

(e) Equipment that is in vacuum service is excluded from the requirements of § 61.242-2, to § 61.242-11 if it is identified as required in § 61.246(e)(5).

§ 61.242-2 Standards: Pumps.

(a)(1) Each pump shall be monitored monthly to detect leaks by the methods specified in § 61.245(b), except as provided in § 61.242-1(c) and paragraphs (d), (e), and (f) of this section.

(2) Each pump shall be checked by visual inspection each calendar week for indications of liquids dripping from the pump seal.

(b)(1) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(2) If there are indications of liquids dripping from the pump seal, a leak is detected.

(c)(1) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in § 61.242-10.

(2) A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(d) Each pump equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from the requirements of paragraph (a), provided the following requirements are met:

(1) Each dual mechanical seal system is:

(i) Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure; or

(ii) Equipped with a barrier fluid degassing reservoir that is connected by a closed-vent system to a control device that complies with the requirements of § 61.242-11; or

(iii) Equipped with a system that purges the barrier fluid into a process stream with zero VHAP emissions to atmosphere.

(2) The barrier fluid is not in VHAP service and, if the pump covered by standards under 40 CFR Part 60, is not in VOC service.

(3) Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.

(4) Each pump is checked by visual inspection each calendar week for indications of liquids dripping from the pump seal.

(5)(i) Each sensor as described in paragraph (d)(3) of this section is checked daily or is equipped with a audible alarm, and

(ii) The owner or operator determines, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

(6)(i) If there are indications of liquids dripping from the pump seal or the sensor indicates failure of the seal system, the barrier fluid system, or both based on the

criterion determined in paragraph (d)(5)(ii), a leak is detected.

(ii) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in § 61.242-10.

(iii) A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(e) Any pump that is designated, as described in § 61.246(e)(2), for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of paragraphs (a), (c), and (d) if the pump:

(1) Has no externally actuated shaft penetrating the pump housing,

(2) Is demonstrated to be operating with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as measured by the method specified in § 61.245(c), and

(3) Is tested for compliance with paragraph (e)(2) initially upon designation, annually, and at other times requested by the Administrator.

(f) If any pump is equipped with a closed-vent system capable of capturing and transporting any leakage from the seal or seals to a control device that complies with the requirements of § 61.242-11, it is exempt from the requirements of paragraphs (a)-(e).

§ 61.242-3 Standards: Compressors.

(a) Each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of process fluid to atmosphere, except as provided in § 61.242(1(c) and paragraphs (h) and (i) of this section.

(b) Each compressor seal system as required in paragraph (a) shall be:

(1) Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure; or

(2) Equipped with a barrier fluid system that is connected by a closed-vent system to a control device that complies with the requirements of § 61.242-11; or

(3) Equipped with a system that purges the barrier fluid into a process stream with zero VHAP emissions to atmosphere.

(c) The barrier fluid shall not be in VHAP service and, if the compressor is covered by standards under 40 CFR Part 60, shall not be in VOC service.

(d) Each barrier fluid system as described in paragraphs (a)-(c) of this section shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.

(e)(1) Each sensor as required in paragraph (d) shall be checked daily or shall be equipped with an audible alarm.

(2) The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

(f) If the sensor indicates failure of the seal system, the barrier fluid system, or both based on the criterion determined under paragraph (e)(2) of this section, a leak is detected.

(g)(1) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in § 61.242-10.

(2) A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(h) A compressor is exempt from the requirements of paragraphs (a) and (b) if it is equipped with a closed-vent system capable of capturing and transporting any leakage from the seal to a control device that complies with the requirements of § 61.242-11, except as provided in paragraph (i).

(i) Any compressor that is designated, as described in § 61.246(e)(2), for no detectable emission as indicated by an instrument reading of less than 500 ppm above background is exempt from the requirements of paragraphs (a)-(h) if the compressor:

(1) Is demonstrated to be operating with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as measured by the method specified in § 61.245(c); and

(2) Is tested for compliance with paragraph (i)(1) initially upon designation, annually, and at other times requested by the Administrator.

§ 61.242-4 Standards: Pressure relief devices in gas/vapor service.

(a) Except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as measured by the method specified in § 61.245(c).

(b)(1) After each pressure release, the pressure relief device shall be returned to a condition of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as soon as practicable, but no later than 5 calendar days after each pressure release.

(2) No later than 5 calendar days after the pressure release, the pressure relief device shall be monitored to confirm the condition of no detectable emissions, as indi-

cated by an instrument reading of less than 500 ppm above background, as measured by the method specified in § 61.245(c).

(c) Any pressure relief device that is equipped with a closed-vent system capable of capturing and transporting leakage from the pressure relief device to a control device as described in § 61.242-11 is exempt from the requirements of paragraph (a) and (b).

§ 61.242-5 Standards: Sampling connecting systems.

(a) Each sampling connection system shall be equipped with a closed-purge system or closed vent system, except as provided in § 61.242-1(c).

(b) Each closed-purge system or closed-vent system as required in paragraph (a) shall:

(1) Return the purged process fluid directly to the process line with zero VHAP emissions to atmosphere; or

(2) Collect and recycle the purged process fluid with zero VHAP emissions to atmosphere; or

(3) Be designed and operated to capture and transport all the purged process fluid to a control device that complies with the requirements of § 61.242-11.

(c) *In-situ* sampling systems are exempt from the requirements of paragraphs (a) and (b).

§ 61.242-6 Standards: Open-ended valves or lines.

(a)(1) Each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve, except as provided in § 61.242-1(c).

(2) The cap, blind flange, plug, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line.

(b) Each open-ended valve or line equipped with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

(c) When a double block and bleed system is being used, the bleed valve or line may remain open during operations that require venting the line between the block valves but shall comply with paragraph (a) at all other times.

§ 61.242-7 Standards: Valves.

(a) Each valve shall be monitored monthly to detect leaks by the method specified in § 61.245(b) and shall comply with paragraphs (b)-(e), except as provided in paragraphs (f), (g), and (h) of this section, §§ 61.243-1 or 61.243-2, and § 61.242-1(c).

(b) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(c)(1) Any valve for which a leak is not detected for 2 successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected.

(2) If a leak is detected, the valve shall be monitored monthly until a leak is not detected for 2 successive months.

(d)(1) When a leak is detected, it shall be repaired as soon as practicable, but no later than 15 calendar days after the leak is detected, except as provided in § 61.242-10.

(2) A first attempt at repair shall be made no later than 5 calender days after each leak is detected.

(e) First attempts at repair include, but are not limited to, the following best practices where practicable:

(1) Tightening of bonnet bolts;

(2) Replacement of bonnet bolts;

(3) Tightening of packing gland nuts; and

(4) Injection of lubricant into lubricated packing.

(f) Any valve that is designated, as described in § 61.246(e)(2), for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of paragraph (a) if the valve:

(1) Has no external actuating mechanism in contact with the process fluid;

(2) Is operated with emissions less than 500 ppm above background, as measured by the method specified in § 61.245(c); and

(3) Is tested for compliance with paragraph (f)(2) initially upon designation, annually, and at other times requested by the Administrator.

(g) Any valve that is designated, as described in § 61.246(f)(1), as an unsafe-to-monitor valve is exempt from the requirements of paragraph (a) if:

(1) The owner or operator of the valve demonstrates that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with paragraph (a); and

(2) The owner or operator of the valve has a written plan that requires monitoring of the valve as frequent as practicable during safe-to-monitor times.

(h) Any valve that is designated, as described in § 61.246(f)(2), as a difficult-to-monitor valve is exempt from the requirements of paragraph (a) if:

(1) The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface;

(2) The process unit within which the valve is located is an existing process unit; and

(3) The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

§ 61.242-8 Standards: Pressure relief devices in liquid service and flanges and other connectors.

(a) Pressure relief devices in liquid service and flanges and other connectors shall be monitored within 5 days by the method specified in § 61.245(b) if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method.

(b) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(c)(1) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in § 61.242.10.

(2) The first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(d) First attempts at repair include, but are not limited to, the best practices described under § 61.242-7(e).

§ 61.242-9 Standards: Product accumulator vessels.

Each product accumulator vessel shall be equipped with a closed-vent system capable of capturing and transporting any leakage from the vessel to a control device as described in § 61.242-11.

§ 61.242-10 Standards: Delay of repair.

(a) Delay of repair of equipment for which leaks have been detected will be allowed if the repair is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown.

(b) Delay of repair of equipment for which leaks have been detected will be allowed for equipment that is isolated from the process and that does not remain in VHAP service.

(c) Delay of repair for valves will be allowed if:

(1) The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay or repair, and

(2) When repair procedures are effected, the purged material is collected and destroyed or recovered in a control device complying with § 61.242-11.

(d) Delay of repair for pumps will be allowed if:

(1) Repair requires the use of a dual mechanical seal system that includes a barrier fluid system, and

(2) Repair is completed as soon as practicable, but not later than 6 months after the leak is detected.

(e) Delay of repair beyond a process unit shutdown will be allowed for a valve if valve assembly replacement is necessary during the process unit shutdown, valve assembly supplies have been depleted, and valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

§ 61.242-11 Standards: Closed-vent systems and control devices.

(a) Owners or operators of closed-vent systems and control devices used to comply with provisions of this subpart shall comply with the provisions of this section.

(b) Vapor recovery systems (for example, condensers and adsorbers) shall be designed and operated to recover

the organic vapors vented to them with an efficiency of 95 percent or greater.

(c) Enclosed combustion devices shall be designed and operated to reduce the VHAP emissions vented to them with an efficiency of 95 percent or greater or to provide a minimum residence time of 0.50 seconds at a minimum temperature of 760°C.

(d)(1) Flares shall be designed for an operated with no visible emissions as determined by the methods specified in § 61.245(e), except for periods not to exceed a total of 5 minutes during any 1 consecutive hours.

(2) Flares shall be operated with a flame present at all times, as determined by the methods specified in § 61.245.(e).

(3) Flares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 7.45 MJ/scm or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the method specified in § 61.245(e).

(4) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the method specified in § 61.245(e)(4), less than 18 m/sec (60 ft/sec).

(5) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, v_{max}, as determined by the method specified in §61.245(e)(5).

(6) Flares used comply with this subpart shall be steam-assisted, air-assisted, or nonassisted.

(e) Owners or operators of control devices that are used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their design.

(f)(1) Closed-vent systems shall be designed for and operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background and by visual inspections, as determined by the methods specified as § 61.245(c).

(2) Closed-vent systems shall be monitored to determine compliance with this section initially in accordance with § 61.05, annually, and at other times requested by the administrator.

(3) Leaks, as indicated by an instrument reading greater than 500 ppm and visual inspections, shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected.

(4) A first attempt at repair shall be made no later than 5 calendar days after the leak is detected.

(g) Closed-vent systems and control devices use to comply with provisons of this subpart shall be operated at all times when emissions may be vented to them.

§ 61.243-1 Alternative standards for valves in VHAP service—allowable percentage of valves leaking.

(a) An owner or operator may elect to have all valves within a process unit to comply with an allowable percentage of valves leaking of equal to or less than 2.0 percent.

(b) The following requirements shall be met if an owner or operator decided to comply with an allowable percentage of valves leaking.

(1) An owner or operator must notify the Administrator that the owner or operator has elected to have all valves within a process unit to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in § 61.247(d).

(2) A performance test as specified in paragraph (c) of this section shall be conducted initially upon designa-

tion, annually, and at other times requested by the Administrator.

(3) If a valve leak is detected, it shall be repaired in accordance with § 61.242-7(d) and (e).

(c) Performance test shall be conducted in the following manner:

(1) All valves in VHAP service within the process unit shall be monitored within 1 week by the methods specified in § 61.245(b).

(2) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(3) The leak percentage shall be determined by dividing the number of valves in VHAP service for which leaks are detected by the number of valves in VHAP service within the process unit.

(d) Owner or operators who elect to have all valves comply with this alternative standard shall not have a process unit with a leak percentage greater than 2.0 percent.

(e) If an owner or operator decides no longer to comply with § 61.243-1, the owner or operator must notify the Administrator in writing that the work practice standard described in § 61.242-7(a)-(e) will be followed.

§ 61.243-2 Alternative standards for valves in VHAP service—skip period leak detection and repair.

(a)(1) An owner or operator may elect for all valves within a process unit to comply with one of the alternative work practices specified in paragraphs (b)(2) and (3) of this section.

(2) An owner or operator must notify the Administrator before implementing one of the alternative work practices, as specified in § 61.247(d).

(b)(1) An owner or operator shall comply initially with the requirements for valves, as described in § 61.242-7.

(2) After 2 consecutive quarterly leak detection periods with the percentage of valves leaking equal to or less than 2.0, an owner or operator may begin to skip 1 of the quarterly leak detection periods for the valves in VHAP service.

(3) After 5 consecutive quarterly leak detection periods with the percentage of valves leaking equal to or less than 2.0, an owner or operator may begin to skip 3 of the quarterly leak detection periods for the valves in VHAP service.

(4) If the percentage of valves leaking is greater than 2.0, the owner or operator shall comply with the requirements as described in § 61.242-7 but may again elect to use this section.

§ 61.244 Alternative means of emission limitation.

(a) Permission to use an alternative means of emission limitation under Section 112(e)(3) of the Clean Air Act shall be governed by the following procedures:

(b) Where the standard is an equipment, design, or operational requirement:

(1) Each owner or operator applying for permission shall be responsible for collecting and verifying test data for an alternative means of emission limitation.

(2) The Administrator will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements.

(3) The Administrator may condition the permission on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements.

(c) Where the stanadrd is a work practice:

(1) Each owner or operator applying for permission shall be responsible for collecting and verifying test data for an alternative means of emission limitation.

(2) For each source for which permission is requested the emission reduction achieved by the required work practices shall be demonstrated for a minimum period of 12 months.

(3) For each source for which permission is requested the emission reduction achieved by the alternative means of emission limitation shall be demonstrated.

(4) Each owner or operator applying for permission shall commit in writing each source to work practices that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practices.

(5) The Administrator will compare the demonstrated emission reduction for the alternative means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment in paragraph (c)(4).

(6) The Administrator may condition the permission on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practices of this subpart.

(d) An owner or operator may offer a unique approach to demonstrate the alternative means of emission limitation.

(e)(1) Manufacturers of equipment used to control equipment leaks of a VHAP may apply to the Administrator for permission for an alternative means of emission limitation that achieves a reduction in emissions of the VHAP achieved by the equipment, design, and operational requirements of this subpart.

(2) The Administrator will grant permission according to the provisions of paragraphs (b), (c), and (d).

§ 61.245 Test methods and procedures.

(a) Each owner or operator subject to the provisions of this subpart shall comply with the test methods and procedures requirements provided in this section.

(b) Monitoring, as required in § 61.242, § 61.243, and § 61.244, shall comply with the following requirements:

(1) Monitoring shall comply with Reference Method 21.

(2) The detection instrument shall meet the performance criteria of Reference Method 21.

(3) The instrument shall be calibrated before use on each day of its use by the procedures specified in Reference Method 21.

(4) Calibration gases shall be:

(i) Zero air (less than 3 ppm of hydrocarbon in air); and

(ii) A mixture of ethane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

(5) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21.

(c) When equipment is tested for compliance with no detectable emissions, as required in §§ 61.242-2(e), 61.242-3(i), 61.242-4, 61.242-7(f), and 61.242-11(f), the test shall comply with the following requirements:

(1) The requirements of paragraphs (b)(1)-(4) shall apply.

(2) The background level shall be determined, as set forth in Reference Method 21.

(3) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21.

(4) The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 655 upm for determining compliance.

(d)(1) Each piece of equipment within a process unit that can conceivably contain equipment in VHAP service is presumed to be in VHAP service unless an owner or operator demonstrates that the piece of equipment is not in VHAP service. For a piece of equipment to be considered not in VHAP service, it must be determined that the percent VHAP content can be reasonably expected never to exceed 10 percent by weight. For purposes of determining the percent VHAP content of the process fluid that is contained in or contacts equipment, procedures that conform to the methods described in ASTM Method D-2267 (incorporated by the reference as modified in § 61.18) shall be used.

(2)(i) An owner or operator may use engineering judgment rather than the procedures in paragraph (d)(1) of this section to demonstrate that the percent VHAP content does not exceed 10 percent by weight, provided that the engineering judgment demonstrates that the VHAP content clearly does not exceed 10 percent by weight. When an owner or operator and the Administrator do not agree on whether a piece of equipment is not in VHAP service, however, the procedures in paragraph (d)(1) of this section shall be used to resolve the disagreement.

(ii) If an owner or operator determines that a piece of equipment is in VHAP service, the determination can be revised only after following the procedures in paragraph (d)(1) of this section.

(3) Samples used in determining the percent VHAP content shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in the flare.

(e)(1) Reference Method 22 shall be used to determine compliance of flares with the visible emission provisions of this subpart.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \left(\sum_{i=1}^{n} C_i H_i \right)$$

Where:

H_T = Net heating value of the sample, MJ/scm: where net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determiinng the volume corresponding to one mole is 20°C.

K = Constant, 1.740×10^7 (1/ppm) (g mole/scm) (MJ/kcal) where standard temperature for (g mole/scm) is 20°C.

C_i = Concentration of sample component i in ppm, as measured by Reference Method 18 of Appendix A of 40 FR Part 60 and ASTM D2504-67 (reapproved 1977) (incorporated by reference as specified in § 61.18).

H_i = Net heat of combustion of sample component i, kcal/g mole. The heats of combustion may be determined using ASTM D2382-76 (incorporated by reference as specified in § 61.18) if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Method 2, 2A, 2C, or 2D, as appropriate, by the unobstructed (free) cross section area of the flare tip.

(5) The maximum permitted velocity, V_{max}, for air-assisted flares shall be determined by the following equation:

$$VMax = 8.76 + 0.7084(H_T)$$

Where:

VMax = Maximum permitted velocity, m/sec 8.706 = Constant.

0.7084 = Constant.

H_T = The net heating value as determined in paragraph (e)(3) of this section.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414).)

§ 61.246 Recordkeeping requirements.

(a)(1) Each owner or operator subject to the provisions of this subpart shall comply with the recordkeeping requirements of this section.

(2) An owner or operator of more than one process unit subject to the provisions of this subpart may comply with the recordkeeping requirements for these process units in one recordkeeping system if the system identifies each record by each process unit.

(b) When each leak is detected as specified in §§ 61.242-2, 61.242-3, 61.242-7, and 61.242-8, the following requirements apply:

(1) A weatherproof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment.

(2) The identification on a valve may be removed after it has been monitored for 2 successive months as specified in § 61.242-7(c) and no leak has been detected during those 2 months.

(3) The identification on equipment, except on a valve, may be removed after it has been repaired.

(c) When each leak, is detected as specified in §§ 61.242-2, 61.242-3, 61.242-7, and 61.242-8, the following information shall be recorded in a log and shall be kept for 2 years in a readily accessible location:

(1) The instrument and operator identification numbers and the equipment identification number.

(2) The date the leak was detected and the dates of each attempt to repair the leak.

(3) Repair methods applied in each attempt to repair the leak.

(4) "Above 10,000" if the maximum instrument reading measured by the methods specified in § 61.245(a) after each repair attempt is esqual to or greater than 10,000 ppm.

(5) "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

(6) The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

(7) The expected date of successful repair of the leak if a leak is not repaired within 15 calendar days.

(8) Dates of process unit shutdowns that occur while the equipment is unrepaired.

(9) The date of successful repair of the leak.

(d) The following information pertaining to the design requirements for closed-vent systems and control devices described in § 61.242-11 shall be recorded and kept in a readily accessible location:

(1) Detailed schematics, design specifications, and piping and instrumentation diagrams.

(2) The dates and descriptions of any changes in the design specifications.

(3) A description of the parameter or parameters monitored, as required in § 61.242-11(e), to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter (or parameters) was selected for the monitoring.

(4) Periods when the closed-vent systems and control devices required in §§ 61.242-2, 61.242-3, 61.242-4, 61.242-5 and 61.242-9 are not operatd as designed, including periods when a flare pilot light does not have a flame.

(5) Dates of startups and shutdowns of the closed-vent systems and control devices required in §§ 61.242-2, 61.242-3, 61.242-4, 61.242-5 and 61.242-9.

(e) The following information pertaining to all equipment subject to the requirements in § 61.242-1 to § 61.242-11 shall be recorded in a log that is kept in a readily accessible location:

(1) A list of identification numbers for equipment subject to the requirements of this subpart.

(2)(i) A list of identification numbers for equipment that the owner or operator elects to designate for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, under the provisions of §§ 61.242-2(e), 61.242-3(i), and 61.242-7(f).

(ii) The designation of this equipment as subject to the requirements of § 61.242-2(e), 61.242-3(i), or 61.242-7(f) shall be signed by the owner or operator.

(3) A list of equipment identification numbers for pressure relief devices required to comply with § 61.424-4(a).

(4)(i) The dates of each compliance test required in §§ 61.242-2(e), 61.242-3(i), 61.242-4, and 61.242-7(f).

(ii) The background level measured during each compliance test.

(iii) The maximum instrument reading measured at the equipment during each compliance test.

(5) A list of identification numbers for equipment in vacuum service.

(f) The following information pertaining to all valves subject to the requirements of § 61.242-7(g) and (h) shall be recorded in a log that is kept in a readily accessible location:

(1) A list of identification numbers for valves that are designated as unsafe to monitor, an explanation for each valve stating why the valve is unsafe to monitor, and the plan for monitoring each valve.

(2) A list of identification numbers for valves that are designated as difficult to monitor, an explanation for each valve stating why the valve is difficult to monitor, and the planned schedule for monitoring each valve.

(g) The following information shall be recorded for valves complying with § 61.243-2:

(1) A schedule of monitoring.

(2) The percent of valves found leaking during each monitoring period.

(h) The following information shall be recorded in a log that is kept in a readily accessible location:

(1) Design criterion required in § 61.242-2(d)(5) and § 61.242-3(e)(2) and an explanation of the design criterion; and

(2) Any changes to this criterion and the reasons for the changes.

(i) The following information shall be recorded in a log that is kept in a readily accessible location for use in determining exemptions as provided in the applicability section of this subpart and other specific subparts:

(1) An analysis demonstrating the design capacity of the process unit, and

(2) An analysis demonstrating that equipment is not in VHAP service.

(j) Information and data used to demonstrate that a piece of equipment is not in VHAP service shall be recorded in a log that is kept in a readily accessible location. (Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414).)

§ 61.247 Reporting requirements.

(a)(1) An owner or operator of any piece of equipment to which this subpart applies shall submit a statement in writing notifying the Administrator that the requirements of §§ 61.242, 61.245, 61.246, and 61.247 are being implemented.

(2) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the effective date, unless a waiver of compliance is granted under § 61.11, along with the information required under § 61.10. If a waiver of compliance is granted, the statement is to be submitted on a date scheduled by the Administrator.

(3) In the case of new sources which did not have an initial startup date preceding the effective date, the statement shall be submitted with the application for approval of construction, as described in § 61.07.

(4) The statement is to contain the following information for each source:

(i) Equipment identification number and process unit identification.

(ii) Type of equipment (for example, a pump or pipeline valve).

(iii) Percent by weight VHAP in the fluid at the equipment.

(iv) Process fluid state at the equipment (gas/vapor or liquid).

(v) Method of complince with the standard (for example, "monthly leak detection and repair" or "equipped with dual mechanical seals").

(b) A report shall be submitted to the Administrator semiannually starting 6 months after the initial report required in § 61.247(a), that includes the following information:

(1) Process unit identification.

(2) For each month during the semiannual reporting period.

(i) Number of valves for which leaks were detected as described in § 61.242-7(b) of § 61.243-2.

(ii) Number of valves for which leaks were not repaired as required in § 61.242-7(d).

(iii) Number of pumps for which leaks were detected as described in § 61.242-2(b) and (d)(6).

(iv) Number of pumps for which leaks were not repaired as required in § 61.242-2(c) and (d)(6).

(v) Number of compressors for which leaks were detected as described in § 61.242-3(f).

(vi) Number of compressors for which leaks were not repaired as required in § 61.242-3(g).

(vii) The facts that explain any delay of repairs and, where appropriate, why a process unit shutdown was technically infeasible.

(3) Dates of process unit shutdowns which occurred within the semiannual reporting period.

(4) Revisions to items reported according to paragraph (a) if changes have occurred since the initial report or subsequent revisions to the initial report.

(5) The results of all performance tests to determine compliance with § 61.242-2(e), § 61.242-3(i), § 61.242-4(a), § 61.242-7(f), § 61.242-11(f), § 61.243-1 and § 61.243-2 conducted within the semiannual reporting period.

(c) In the first report submitted as required in § 61.247(a), the report shall include a reporting schedule stating the months that semiannual reports shall be submittted. Subsequent reports shall be submitted according to that schedule, unless a revised schedule has been submitted in a previous semiannual report.

(d) An owner or operator electing to comply with the provisions of §§ 61.243-1 and 61.243-2 shall notify the Administrator of the alternative standard selected 90 days before implementing either of the provisions.

(e) An application for approval of construction or modification, § 61.05(a) and § 61.07, will not be required if—

(1) The new source complies with the standard, § 61.242;

(2) The new source is not part of the construction of a process unit; and

(3) In the next semiannual report required by § 61.247(b), the information in § 61.247(a)(4) is reported.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414).) (Approved by the Office of Management and Budget under control number ICR-1153.)

2. By adding paragraphs (a)(4), (5), and (6) to § 61.18 of Subpart A—General Provisions as follows. The

introductory text of the section and of paragraph (a) are shown for reader convenience.

§ 61.18 Incorporation by reference.

The materials listed below are incorporated by reference in the corresponding sections noted. These incorporations by reference were approved by the Director of the Federal Register on the date listed. These materials are incorporated as they exist on the date of the approval, and a notice of any changes in these materials will be published in the Federal Register. The materials are available for purchase at the corresponding address noted below, and all are available for inspection at the Office of the Federal Register Information Center, Room 8401, 1100 L Street, N.W., Washington, D.C. 20408 and the Library (MD-35), U.S. EPA, Research Triangle Park, North Carolina 27711.

(a) The following materials are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103; or the University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

* * * *

(4) ASTM D 2267-68 (Reapproved 1978), Aromatics in Light Naphthas and Aviation Gasolines by Gas Chromatography, IBR approved June 6, 1984, for § 61.245 (d)(1).

(5) ASTM D 2382-76, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), IBR approved June 6, 1984, for § 61.245 (e)(3).

(6) ASTM D 2504-67 (Reapproved 1977), Noncondensable Gases in C_3 and Lighter Hydrocarbon Products

by Gas Chromatography, IBR approved June 6, 1984, for § 61.245(e)(3).

(Sections 112 and 301(a) of the Clean Air Act, as amended, [42 U.S.C. 7412, 7601(a)]).

APPENDIX G

Excerpt from 40 C.F.R. Part 61

§ 61.05 Prohibited activities.

(a) After the effective date of any standard, no owner or operator shall construct or modify any stationary source subject to that standard without first obtaining written approval from the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the Act. Sources, the construction or modification of which commenced after the publication date of the standards proposed to be applicable to the sources, are subject to this prohibition.

(b) After the effective date of any standard, no owner or operator shall operate a new stationary source subject to that standard in violation of the standard, except under an exemption granted by the President under section 112(c)(2) of the Act.

(c) Ninety days after the effective date of any standard, no owner or operator shall operate any existing source subject to that standard in violation of the standard, except under a waiver granted by the Administrator under this part or under an exemption granted by the President under section 112(c)(2) of the Act.

(d) No owner or operator subject to the provisions of this part shall fail to report, revise reports, or report source test results as required under this part.

[38 FR 8826, Apr. 6, 1973, as amended at 50 FR 46291, Nov. 7, 1985]

Excerpts from Subpart FF—National Emission Standard for Benzene Waste Operations

55 Fed. Reg. 8346 (March 7, 1990)

* * * *

§ 61.342 Standards: General.

(a) An owner or operator of a facility at which the total annual benzene quantity from facility waste is less than 10 megagrams per year (Mg/yr) shall be exempt from the requirements of paragraphs (b) and (c) of this section. The total annual benzene quantity from facility waste is the sum of the annual benzene quantity for each waste streams at the facility that has a flow-weighted annual average water content greater than 10 percent. The total annual benzene quantity from facility waste shall be determined in accordance with the procedures specified in § 61.355(a) of this subpart.

* * * *

§ 61.355 Test methods, procedures, and compliance provisions.

(a) An owner or operator shall determine the total annual benzene quantity from facility waste by the following procedure:

(1) For each waste stream subject to this subpart having a flow-weighted annual average water content greater than 10 percent water, the owner or operator shall:

(i) Determine the annual waste quantity for each waste stream at the point of waste generation using the procedures specified in paragraph (b) of this section.

(ii) Determine the flow-weighted annual average benzene concentration for each waste stream at the point of waste generation using the procedures specified in paragraph (c) of this section.

(iii) Calculate the annual benzene quantity for each waste stream by multiplying the annual waste quantity of

the waste stream times the flow-weighted annual average benzene concentration.

(2) Total annual benzene quantity from facility waste is calculated by adding together the annual benzene quantity for each waste stream.

(3) If the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr, then the owner or operator shall comply with the requirements of § 61.342 (c) or (d) of this subpart.

(4) If the total annual benzene quantity from facility waste is less than 10 Mg/yr but is equal to or greater than 1 Mg/yr, then the owner or operator shall:

(i) Comply with the recordkeeping requirements of § 61.356 and reporting requirements of § 61.357 of this subpart; and

(ii) Repeat the determination of total annual benzene quantity from facility waste at least once per year whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr or more.

(5) If the total annual benzene quantity from facility waste is less than 1 Mg/yr, then the owner or operator shall:

(i) Comply with the recordkeeping requirements of § 61.356 and reporting requirements of § 61.357 of this subpart; and

(ii) Repeat the determination of total annual benzene quantity from facility waste whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 1 Mg/yr or more.

(b) An owner or operator shall determine the annual waste quantity for each waste stream by one of the following methods:

(1) Selecting the highest annual quantity of waste managed from historical records representing the most recent 5 years of operation or, if the facility has been in service for less than 5 years but at least 1 year, from historical records representing the total operating life of the facility;

(2) Using the maximum design capacity of the waste management unit; or

(3) Measurements that are representative of maximum waste generation rates.

(c) An owner or operator shall determine the flow-weighted annual average benzene concentration for each waste stream by one of the following methods:

(1) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document the flow-weighted annual average benezene concentration of each waste stream. Examples of information that could constitute knowledge include material balances, records of chemicals purchases, or previous test results provided the results are still relevant to the current waste stream conditions. If test data are used, then the owner or operator shall provide documentation describing the testing protocol and the means by which sampling variability and analytical variability were accounted for in the determination of the flow-weighted annual average benzene concentration for the waste stream.

(2) Measurements of the benzene concentration in the waste stream in accordance with the following procedures:

(i) Collect a minimum of three representative samples from each waste stream. Where feasible, samples shall be taken from an enclosed pipe prior to the waste being exposed to the atmosphere.

(ii) For waste in enclosed pipes, the following procedures shall be used:

(A) Samples shall be collected prior to the waste being exposed to the atmosphere in order to minimize the loss of benzene prior to sampling.

(B) A static mixer shall be installed in the process line or in a by-pass line unless the owner or operator demonstrates that installation of a static mixer in the line is not necessary to accurately determine the benzene concentration of the waste stream.

(C) The sampling tap shall be located within two pipe diameters of the static mixer outlet.

(D) Prior to the initiation of sampling, sample lines and cooling coil shall be purged with at least four volumes of waste.

(E) After purging, the sample flow shall be directed to a sample container and the tip of the sampling tube shall be kept below the surface of the waste during sampling to minimize contact with the atmosphere.

(F) Samples shall be collected at a flow rate such that the cooling coil is able to maintain a waste temperature less than 10°C.

(G) After filling, the sample container shall be capped immediately (within 5 seconds) to leave a minimum headspace in the container.

(H) The sample containers shall immediately be cooled and maintained at a temperature below 10°C for transfer to the laboratory.

(iii) When sampling from an enclosed pipe is not feasible, a minimum of three representative samples shall be collected in a manner to minimize exposure of the sample to the atmosphere and loss of benzene prior to sampling.

(iv) Each waste sample shall be analyzed using one of the following test methods for determining the benzene concentration in a waste stream:

(A) Method 8020, Aromatic Volatile Organics, in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(B) Method 8021, Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(C) Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(D) Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics: Capillary Column Technique in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(E) Method 602, Purgeable Aromatics, as described in 40 CFR part 136, appendix A, Test Procedures for Analysis of Organic Pollutants, for wastewaters for which this is an approved EPA methods; or

(F) Method 624, Purgeables, as described in 40 CFR part 136, appendix A, Test Procedures for Analysis of Organic Pollutants, for wastewaters for which this is an approved EPA method.

(v) The flow-weighted annual average benzene concentration shall be calculated by averaging the results of the sample analyses as follows:

$$C = \frac{1}{Q_t} \times \sum_{i=1}^{n} (Q_i)(C_i)$$

Where:

C = Flow-weighted annual average benzene concentration for waste stream, ppmw.

Q_t = Total annual waste quantity for waste stream, kg/yr.

n = Number of waste samples (at least 3).

Q_i = Annual waste quantity for waste stream represented by C_i, kg/yr.

C_i = Measured concentration of benzene in waste sample i, ppmw.

(d) An owner or operator using performance tests to demonstrate compliance of a treatment process with § 61.348(a)(1)(i) of this subpart shall measure the flow-weighted annual average benzene concentration of the waste stream existing the treatment process by collecting and analyzing a minimum of three representative samples of the waste stream using the procedure in paragraph (c)(2) of this section. The test shall be conducted under conditions that exist when the treatment process is operating at the highest inlet waste stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information as is necessary to document the operating conditions during the test.

(e) An owner or operator using performance tests to demonstrate compliance of a treatment process with § 61.348(a)(1)(ii) of this subpart shall determine the percent reduction of benzene in the waste stream on a mass basis by the following procedure:

(1) The test shall be conducted under conditions that exist when the treatment process is operating at the highest inlet waste stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information as is necessary to document the operating conditions during the test.

(2) All testing equipment shall be prepared and installed as specified in the appropriate test methods.

(3) The mass flow rate of benzene entering the treatment process (E_b) shall be determined by computing the product of the flow rate of the waste stream entering the treatment process, as determined by the inlet flow meter, and the benzene concentration of the waste stream, as determined using the sampling and analytical procedures specified in paragraph (c) of this section. Three grab samples of the waste shall be taken at equally spaced time intervals over a 1-hour period. Each 1-hour period constitutes a run, and the performance test shall consist of a minimum of 3 runs conducted over a 3-hour period. The mass flow rate of benzene entering the treatment process is calculated as follows:

$$E_b = \frac{K}{n \times 10^6} \left(\sum_{i=1}^{n} V_i C_i \right)$$

Where:

E_b = Mass flow rate of benzene entering the treatment process, kg/hour.

K = Density of the waste stream, kg/m^3.

V_i = Average volume flow rate of waste entering the treatment process during each run i, m^3/hour.

C_i = Average concentration of benzene in the waste stream entering the treatment process during each run i, ppmw.

n = Number of runs.

(4) The mass flow rate of benzene exiting the treatment process (E_a) shall be determined by computing the product of the flow rate of the waste stream exiting the treatment process, as determined by the inlet flow meter, and the benzene concentration of the waste stream, as determined using the sampling and analytical procedures specified in paragraph (c) of this section. Three grab samples of the waste shall be taken at equally spaced time intervals over a 1-hour period. Each 1-hour period constitutes a run, and the performance test shall consist of a minimum of 3 runs conducted over the same 3-hour period at which the mass flow rate of benzene entering the treatment process is determined. The mass flow rate of benzene exiting the treatment process is calculated as follows:

$$E_a = \frac{K}{n \times 10^6} \left(\sum_{i=1}^{n} V_i C_i \right)$$

Where:

E_a = Mass flow rate of benzene exiting the treatment process, kg/hour.

K = Density of the waste stream, kg/m^3.

V_i = Average volume flow rate of waste exiting the treatment process during each run i, m^3/hour.

C_i = Average concentration of benzene in the waste stream exiting the treatment process during each run i, ppmw.

n = Number of runs.

(5) The percent reduction across the treatment process shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:

R = Control efficiency of the treatment process, percent.

E_b = Mass flow rate of benzene entering the treatment process, kg/hour.

E_a = Mass flow rate of benzene exiting the treatment process, kg/hour.

(f) An owner or operator using performance tests to demonstrate compliance of a treatment process with § 61.348(a)(1)(iii) of this subpart shall determine the benzene destruction efficiency for the combustion unit by the following procedure:

(1) The test shall be conducted under conditions that exist when the combustion unit is operating at the highest inlet waste stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information necessary to document the operating conditions during the test.

(2) All testing equipment shall be prepared and installed as specified in the appropriate test methods.

(3) The mass flow rate of benzene entering the combustion unit shall be determined by computing the product of the flow rate of the waste stream entering the combustion unit, as determined by the inlet flow meter, and the benzene concentration of the waste stream, as determined using the sampling procedures in paragraph (c) of this section. Three grab samples of the waste shall be taken at equally spaced time intervals over a 1-hour period. Each 1-hour period constitutes a run, and the performance test shall consist of a minimum of 3 runs conducted over a

3-hour period. The mass flow rate of benzene into the combustion unit is calculated as follows:

$$E_b = \frac{K}{n \times 10^6} \left(\sum_{i=1}^{n} V_i C_i \right)$$

Where:

E_b = Mass flow rate of benzene into the combustion unit, kg/hour.

K = Density of the waste stream, kg/m^3.

V_i = Average volume flow rate of waste entering the combustion unit during each run i, m^3/hour.

C_i = Average concentration of benzene in the waste stream entering the combustion unit during each run i, ppmw.

n = Number of runs.

(4) The mass flow rate of benzene exiting the combustion unit exhaust stack shall be determined as follows:

(i) The time period for the test shall not be less than 3 hours during which at least 3 stack gas samples are collected and be the same time period at which the mass flow rate of benzene entering the treatment process is determined. Each sample shall be collected over a 1-hour period (e.g., in a tedlar bag) to represent a time-integrated composite sample and each 1-hour period shall correspond to the periods when the waste feed is sampled.

(ii) A run shall consist of a 1-hour period during the test. For each run:

(A) The reading from each measurement shall be recorded;

(B) The volume exhausted shall be determined using method 2, 2A, 2C, or 2D from appendix A of 40 CFR part 60, as appropriate.

(C) The average benzene concentration in the exhaust downstream of the combustion unit shall be determined using method 18 from appendix A of 40 CFR part 60.

(iii) The mass of benzene emitted during each run shall be calculated as follows:

$M_i = KVC(10^{-6})$

Where:

M_i = Mass of benzene emitted during run i, kg.

V = Volume of air-vapor mixture exhausted at standard conditions, m^3.

C = Concentration of benzene measured in the exhaust, ppmv.

K = Conversion factor = 3.24 kg/m^3 for benzene.

(iv) The benzene mass emission rate in the exhaust shall be calculated as follows:

$$E_a = \left(\sum_{i=1}^{n} M_i \right) FT$$

Where:

E_a = Mass flow rate of benzene emitted, kg/hour.

M_i = Mass of benzene emitted during i, kg.

T = Total time of all runs, hour.

n = Number of runs.

(5) The benzene destruction efficiency for the combustion unit shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:

R = Benzene destruction efficiency for the combustion unit, percent.

E_b = Mass flow rate of benzene into the combustion unit, kg/hour.

E_a = Mass flow of benzene from the combustion unit, kg/hour.

(g) An owner or operator using performance tests to demonstrate compliance of a wastewater treatment system unit with § 61.348(b)(1) of this subpart shall measure the flow-weighted annual average benzene concentration of the wastewater stream exiting the unit by collecting and analyzing a minimum of three representative samples of the waste stream using the procedures in paragraph (c)(2) of this section. The test shall be conducted under conditions that exist when the wastewater treatment system is operating at the highest inlet wastewater stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information as is necessary to document the operating conditions during the test.

(h) An owner or operator shall test equipment for compliance with no detectable emissions as required in §§ 61.343 through 61.347, and § 61.349 of this subpart in accordance with the following requirements:

(1) Monitoring shall comply with method 21 from appendix A of 40 CFR part 60.

(2) The detection instrument shall meet the performance criteria of method 21.

(3) The instrument shall be calibrated before use on each day of its use by the procedures specified in method 21.

(4) Calibration gases shall be:

(i) Zero air (less than 10 ppm of hydrocarbon in air); and

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

(5) The background level shall be determined as set forth in method 21.

(6) The instrument probe shall be traversed around all potential leak interfaces as close as possible to the interface as described in method 21.

(7) The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared to 500 ppm for determining compliance.

(i) An owner or operator using a performance test to demonstrate compliance of a control device with the organic reduction efficiency requirement specified under § 61.349(a)(2) of this subpart shall use the following procedures:

(1) The test shall be conducted under conditions that exist when the waste management unit vented to the control device is operating at the highest load or capacity level expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information necessary to document the operating conditions during the test.

(2) Sampling sites shall be selected using method 1 or 1A from appendix A of 40 CFR part 60, as appropriate.

(3) The mass flow rate of organics entering and exiting the control device shall be determined as follows:

(i) The time period for the test shall not be less than 3 hours during which at least 3 stack gas samples are

collected. Samples of the vent stream entering and exiting the control device shall be collected during the same time period. Each sample shall be collected over a 1-hour period (e.g., in a tedlar bag) to represent a time-integrated composite sample.

(ii) A run shall consist of a 1-hour period during the test. For each run:

(A) The reading from each measurement shall be recorded;

(B) The volume exhausted shall be determined using method 2, 2A, 2C, or 2D from appendix A of 40 CFR part 60, as appropriate;

(C) The organic concentration in the vent stream entering and exiting the control shall be determined using method 18 from appendix A of 40 CFR part 60.

(iii) The mass of organics entering and exiting the control device during each run shall be calculated as follows:

$$M_{aj} = K \quad V_{aj} \left(\sum_{i=1}^{n} C_{aj} MW_i \right) (10^{-6})$$

$$M_{bj} = K \quad V_{bj} \left(\sum_{i=1}^{n} C_{bj} MW_i \right) (10^{-6})$$

Where:

M_{aj} = Mass of organics in the vent stream entering the control device during run j, kg.

M_{bj} = Mass of organics in vent stream exiting the control device during run j, kg.

V_{aj} = Volume of vent stream entering the control device during run j at standards conditions, m^3.

V_{bj} = Volume of vent stream exiting the control device during run j at standards conditions, m^3.

C_{aj} = Organic concentration of compound i measured in the vent stream entering the control device as determined by Method 18, ppm by volume on a dry basis.

C_{bj} = Organic concentration of compound i measured in the vent stream exiting the control device as determined by method 18, ppm by volume on a dry basis.

MW_i = Molecular weight of organic compound i in the vent stream kg/kg-mol.

n = Number of organic compounds in the vent stream.

K = Conversion factor for molar volume = 0.0416 kg-mol/m^3 at 293°K and 760 mm Hg).

10^{-6} = Conversion from ppm, ppm^{-1}.

(iv) The mass flow rate of organics entering and exiting the control device shall be calculated as follows:

$$E_a = \left(\sum_{j=1}^{n} M_{aj} \right) / T$$

$$E_b = \left(\sum_{j=1}^{} M_{bj} \right) / T$$

Where:

E_a = Mass flow rate of organics entering the control device, kg/hour.

E_b = Mass flow rate of organics exiting the control device, kg/hour.

M_{aj} = Mass of organics in the vent stream entering the control device during run j, kg.

M_{bj} = Mass of organics in vent stream exiting the control device during run j, kg.

T = Total time of all runs, hour.

n = Number of runs.

(4) The organic reduction efficiency for the control device shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:

R = Total organic reduction efficiency for the control device, percent.

E_b = Mass flow rate of organics entering the control device, kg/hr.

E_a = Mass flow rate of organics exiting the control device, kg/hr.

Excerpts from 40 CFR Part 61, Subpart FF
58 Fed. Reg. 3095 (January 7, 1993)

§ 61.342 Standards: General.

(a) An owner or operator of a facility at which the total annual benzene quantity from facility waste is less than 10 megagrams per year (Mg/yr) shall be exempt from the requirements of paragraphs (b) and (c) of this section. The total annual benzene quantity from facility waste is the sum of the annual benzene quantity for each waste stream at the facility that has a flow-weighted annual average water content greater than 10 percent or that is mixed with water, or other wastes, at any time and the mixture has an annual average water content greater than 10 percent. The benzene quantity in a waste stream is to be counted only once without multiple counting if other waste streams are mixed with or generated from the original waste stream. Other specific requirements for calculating the total annual benzene waste quantity are as follows:

(1) Wastes that are exempted from control under §§ 61.342(c)(2) and 61.342(c)(3) are included in the calculation of the total annual benzene quantity if they have an annual average water content greater than 10 percent, or if they are mixed with water or other wastes at any time and the mixture has an annual average water content greater than 10 percent.

(2) The benzene in a material subject to this subpart that is sold is included in the calculation of the total annual benzene quantity if the material has an annual average water content greater than 10 percent.

(3) Benzene in wastes generated by remediation activities conducted at the facility, such as the excavation of contaminated soil, pumping and treatment of groundwater, and the recovery of product from soil or groundwater, are not included in the calculation of total annual benzene quantity for that facility. If the facility's total annual ben-

zene quantity is 10 Mg/yr or more, wastes generated by remediation activities are subject to the requirements of paragraphs (c) through (h) of this section. If the facility is managing remediation waste generated offsite, the benzene in this waste shall be included in the calculation of total annual benzene quantity in facility waste, if the waste streams have an annual average water content greater than 10 percent, or if they are mixed with water or other wastes at any time and the mixture has an annual average water content greater than 10 percent.

(4) The total annual benzene quantity is determined based upon the quantity of benzene in the waste before any waste treatment occurs to remove the benzene except as specified in § 61.355(c)(1)(i) (A) through (C).

APPENDIX H

INITIAL REPORT OF E. BRUCE NAUMAN

The 1984 benzene NESHAPs promulgated by the Environmental Protection Agency ("EPA") on June 6, 1984, exempts from coverage plant sites that "produce or use less than 1,000 megagrams of benzene per year." The preamble to the final benzene NESHAPs and supporting documents in the rulemaking record clearly treat the terms "use" and "consumption" as interchangeable in explaining the meaning of the exemption. Therefore, based on a review of the language of the benzene NESHAPs, the preamble to the final benzene NESHAPs, and other material in the rulemaking docket, the Hoechst Celanese Corporation (HCC) and responsible state agencies (for example, the Texas Air Control Board) correctly concluded that EPA intended to exempt from the NESHAPs any plants that "used' less than 1,000 megagrams of benzene based on a single counting of benzene at the site.

Nonetheless, I am informed that the EPA staff has attempted to redefine the word "use" to dramatically narrow the scope of the exemption. EPA staff has done this by attempting to require a multiple counting of the same gram of benzene as it is recirculated in internal process loops at a plant site where benzene is present. The fallacy of this approach is evident when one applies it either to the term "produce" or the term "use," as those terms appear in the exemption provision. Let me explain why this is so both in the case of facilities that "produce" benzene and in the case of facilities that "use" benzene.

1. Plain Meaning of the Exemption

A plant site designed to produce less than 1,000 megagrams of benzene per year will start with a raw material and generate from it an annual quantity of benzene, potentially available for sale, that is less than 1,000 megagrams. The word "produce" is unambiguous in this context. All significant producers of benzene were identified and con-

sidered in the rulemaking process. Each benzene-producing facility includes distillation as a key step. Distillation, by its very nature, creates recycle streams within the process unit. These streams are (1) internal to the distillation column, (2) between the column and the reboiler, and (3) between the column and the condenser. If one were to calculate the amounts of benzene recirculated through each of these streams and add them together, the sum would be many times greater than the amount of benzene actually produced by the benzene production unit (the "throughput"). Internal recycle streams are never counted in determining production and therefore are not included in the calculation of throughput.

In short, in calculating how much benzene is produced by a plant site, it is plainly erroneous to include a multiple counting of the benzene that is recirculated in internal recycle streams. Such a multiple counting would result in "production rates" grossly in excess of the amount actually produced and potentially available for sale.

The same principle applies to process units that use or "consume" benzene as an agent in the production of another product. Typically, such units also have internal recycle streams, but the amount of benzene used is the amount that must be purchased each year, not the amount, many times greater, that has recirculated internally.

An automobile's cooling system is a simple example of a process unit analogous to a facility that recycles benzene internally. The coolant or antifreeze is recycled through the system when the automobile operates. At the end of a year, the automobile may require the addition of some antifreeze to maintain a full cooling system. The cooling system would be considered to have "used" antifreeze during the year equivalent to the amount purchased and added to the system. Under generally accepted chemical engineering principles, the molecules of antifreeze would not be recounted multiple times as they are recycled in the cooling system in order to calculate a "use" number. Otherwise, the cooling system would be considered to have

"used" tens of thousands of gallons of antifreeze over the course of the year. These principles of chemical engineering apply equally to the calculation of benzene used in a facility that recycles benzene internally.

2. The Background Information Document

That the EPA staff's post-promulgation reinterpretation of the exemption to suggest "use" involves a calculation based on multiple counting of the same molecules of benzene over and over again has no basis in science, chemical engineering or common sense is confirmed by a review of the background information document ("BID") for the benzene NESHAPs. The BID explains that benzene "use" is to be determined through a "mass balance." The generally accepted meaning of mass balance within the chemical engineering profession is a calculation designed to account for the amounts of all material entering and leaving a particular process (subject to inventory changes). In light of the well known "conservation of matter" principle (matter can neither be created nor destroyed), the amount of material entering a process must not exceed the amount leaving. Mass balances are therefore commonly used in chemical facilities to determine the amount of fugitive emissions of chemicals used in the process. Often this is accomplished by inferring the amount of a particular chemical emitted to the air by measuring the amounts of that chemical in other known sources of losses, e.g., wastewater streams, pollution control devices, incorporation into the product, and subtracting that figure from the amount entering the process. The difference is the amount of the chemical emitted to the air. In performing this calculation, plant chemical or process engineers place a theoretical "black box" or "control volume" around the plant or piece of equipment for which a mass balance is to be measured. Recycle streams internal to the control volume are never considered in mass balance calculations. Indeed, the imagery associated with the term "black box" reflects the fact that one need

not know what is inside the "black box" control volume to make the calculation.

The BID further states that the "mass balance" is used to calculate the "throughput of benzene, accumulating all benzene processed in a year. The "throughput" for the plant site or for a process unit is equal to the mass balance performed on that control volume—effectively the amount the site or unit consumes. It does not consider or count internal processes or internal processing rates, since they are unrelated to and independent of the "throughput" calculation for the plant site or process unit.

EPA staff has tried to equate "processing rate" with "throughput." Although this may be appropriate in some cases, it is not appropriate in the context of this exemption. "Processing rate" is the instantaneous flow rate of material through some piece of equipment, such as a flange in a recycle stream of a distillation column. "Throughput," in the context of the exemption, is the net flow through the process unit as a whole. (By "process unit," I mean the unit that produces the final product for which the unit has been designed to produce. For example, the acid recovery or anhydride manufacturing units at the Celriver and Celco plants are process units.)

3. The PES Memo

In 1983, PES, Inc., EPA's consultant in developing and preparing the benzene NESHAPs, wrote a memorandum (the "PES Memo") to explain the basis of the 1,000 megagram exemption in the benzene NESHAPs. The PES Memo uses the "nameplate" capacities of production process units to correlate fugitive emissions with poduction rates for the purpose of evaluating effect of establishing an exemption level at various facilities with nameplace capacities between 100 and 1,000 megagrams per year. The nameplate capacity, or design capacity, is the amount of benzene that the plant can produce and make available for sale in any one year. It does not include a considera-

tion of how many times benzene may be recycled or circulated through various loops during the course of its production. In other words, nameplate capacity is not a multiple-count number. Thus, the PES Memo confirms that the measurement of design capacity does not involve multiple counting of benzene in facilities that recycle benzene in the process of producing it.

4. The SOCMI VOC NSPS

The PES Memo was based upon and tracked almost verbatim a memorandum previously prepared by Radian Corporation, another consultant employed by EPA in a parallel EPA rulemaking to establish new source performance standards for the synthetic organic chemical manufacturing industry ("SOCMI"), the so-called SOCMI Volatile Organic Compound New Source Performance Standards ("SOCMI VOC NSPS"). The memorandum explaining the basis for an almost identical exemption in the SOCMI rulemaking makes it clear that the drafters of the SOCMI regulation were not considering internal recycling in constructing the exemption. Like its successor, the PES Memo, the Radian memorandum (1) uses three fictional production models; (2) calculates emissions using SOCMI principles (each category of equipment in a chemical facility, pump, flange, valve, etc., regardless of size is assumed to have a specific leak/emission rate); and (3) does not consider the effect of recycling or engage in multiple counting of recirculated chemicals. In fact, the assertion that the cumulative volume of an internally recycled chemical would serve as a valid measure for emission calculations runs directly counter to the SOCMI principles. Additionally, the Radian memorandum, like the PES Memo, after going through its various calculations, makes it clear that the exemption was not based on the amount of emissions or pieces of equipment, but instead is based on the amount of the chemical that is used up or consumed annually. This makes the exemption

provision "easily understood" and "easy to apply" since a plant need only look to its records of purchases to determine whether it qualifies for the exemption. Thus, contrary to the EPA staff's contentions, the number of pieces of equipment in benzene service at a plant site is irrelevant to the application of the exemption.

Additionally, the BID for the SOCMI VOC NSPS, which was prepared by the same EPA staff that prepared the benzene NESHAPs, specifically rejected the concept of "processing rate"—the underpinning of the multiple-counting approach now relied upon by EPA staff—as a basis for determining applicability of the parallel SOCMI VOC NSPS exemption. In connection with that exemption provision, the EPA staff determined that "production rate" was the appropriate measure. ("Production rate" refers to the volume or weight of the output of the unit rather than the cumulative volume or weight of materials recirculated internally based on a multiple counting of those materials in each process stream.)

5. Ease of Application

In contrast to basing the exemption on consumption or purchase data, the EPA staff's current interpretation of the exemption provision is not only not "easily understood," it is also quite difficult to apply. Such application requires a process flow diagram at a minimum; often, though, more information is needed than appears on many standard diagrams.

The difficulty that one would have in applying EPA staff's multiple counting definition of "use" is apparent from the fact that EPA staff has yet to set out exactly how its multiple-count approach is to be applied at various types of plants at various sites. This has resulted in situations where different regulators, looking at the same facility, have been unable to agree on how to calculate the amount of benzene use based on a multiple-count approach.

The absence of a uniform approach has led to situations in which EPA regional offices have failed to apply the multiple-count approach currently espoused by EPA staff. This is apparently what happened at a Department of Defense facility—the Savannah River facility—where EPA was asked to determine if the facility would be covered by or exempt from the benzene NESHAPs. That facility recycled benzene as shown in the documents furnished to EPA. If there had been a multiple counting of benzene at the facility, then the facility would have been found to have exceeded the exemption amount. Apparently unmindful of the multiple-count approach, the EPA staff involved in the Savannah River exemption determination did not attempt to perform a multiple-count calculation nor request information necessary for such a calculation to be made until 1994. Thus, EPA initially concluded that the Savannah River facility was exempt from the benzene NESHAPs even though it had recycle streams that exceeded 1,000 megagrams per year under the multiple-count approach.

6. Anomalies Created by Application of a Multiple-Count Approach

EPA staff's new interpretation of the benzene NESHAPs would virtually eliminate the exemption for even the simplest and smallest of users of benzene who recycle benzene in their operations while exempting large users of benzene who do not recycle. Specifically, a facility that recycles less than a drum of benzene (34 gallons) in a simple, once-a-day recycling operation would exceed the exemption limit, whereas a facility that was designed to use, but did not recycle, 999 megagrams of benzene annually (approximately 297,000 gallons) would be exempt. Since this result would seemingly be contrary to the ultimate purpose of the benzene NESHAPs—the reduction of benzene fugitive air emissions—it would not be reasonable for a chemical engineer or someone else

making a good faith interpretation of the exemption provision to conclude that the cumulative amount of recycled benzene was to be considered in applying the exemption. This was clearly not the intent expressed in the preamble, the BID or the supporting materials in the rulemaking docket.

7. Additional Issues

Finally, it should be noted that the EPA engineers primarily responsible for the exemption language and its reinterpretation, by their own admission, are not chemical engineers and lack expertise in the chemical industry. To those familiar with the industry, the exemption language appeared plain, simple, and easy to apply. As currently interpreted by the EPA staff, the exemption is neither easily understood nor easy to apply.

8. Conclusion

Therefore, as a professor of chemical engineering, I am of the opinion that the exemption provision cannot reasonably be understood to require facilities that recycle benzene to engage in a multiple counting of the amount of internally recycled benzene as it circulates over and over again through each process stream of a process unit. Rather, the only logical interpretation of the exemption provision is that it requires facilities, regardless of whether they recycle benzene, to determine whether their annual "use" of benzene, as measured by consumption of benzene, is less than 1,000 megagrams.

[Copy of resume and other information described in Rule 26 of the Federal Rules of Civil Procedure are omitted in printing.]

AFFIDAVIT OF E. BRUCE NAUMAN

I, E. Bruce Nauman, Phd., hereby depose and state as follows:

1. The March 29, 1982, Radian Memorandum by John H.E. Stelling, III, was prepared for EPA to explain and justify the exemption to the SOCMI NSPS. It also was the basis for the May 20, 1983, David Cole PES Memorandum discussing the basis for the exemption to the benzene NESHAPs. After considering number of pieces of equipment and quantity of emissions as extrapolated therefrom, Radian chose instead to base the exemption cutoff on the amount of SOCMI chemicals "produced" by a facility, as reflected by the facility's "nameplate capacity."[1] "Nameplate capacity" is a commonly understood engineering term meaning the maximum amount of product a plant can make available for sale in any one year. Although chemical production facilities almost always involve internal recycle of the chemicals they produce, "nameplate capacity" is indisputably a single count concept. It is not inflated by the number of times the product may be recycled through various internal loops during the course of production.

2. The analogous PES Memorandum for the NESHAPs, also considered—*and explicitly rejected*—the idea of basing a cutoff on either the number of pieces of equipment at a plant site or the quantity of fugitive emissions at the site because any such cutoff would be difficult to apply. Instead, the PES Memorandum—

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[1] The technological foundation used for supporting and justifying both exemptions is the SOCMI principle for calculating fugitive emission. That principle expressly provides that fugitive emissions are not affected by processing rate or throughput, but, as is discussed in the Radian and PES Memoranda, are determined by applying average emission factors developed from generic types of pieces of equipment to the number of those types of pieces of equipment at a facility.

like the Radian Memorandum—finally concluded that the exemption should be based on "*design production capacity . . . because it is easily understood and can be applied readily to each location.*" The only type of capacity studied and ultimately recommended for the exemption, was each facility's "nameplate capacit[y]," which—as noted above—is a single count concept that is not affected by the volume or rate of internal benzene recycle.

3. Equally telling, despite the fact that Radian and PES were evaluating facilities which, by their nature, used recycle in their processes, is that there was no effort to calculate any multiple counting of the chemicals produced or used at such facilities. Nor did Radian or PES use any multiple counting figures to calculate the cost-effectiveness of any cutoff. Instead, both Radian and PES recommended establishing exemptions based on a single count concept: nameplate capacity. Specifically, based on a review of the few data points provided by the three studied SOCMI production facilities, Radian and PES plotted lines purporting to make correlations between cost-effectiveness and (1) the nameplate capacity of plants producing SOCMI chemicals, (2) emissions from such facilities, and (3) the number of pieces of equipment at the facilities.[2] Name-

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[2] It is of course, unsound to assume that a few data points for a few facilities can be used to predict emissions for other chemical facilities. EPA recognizes this by saying that some of the facilities that it wanted to exempt would have too many pieces of equipment. Further, since the analysis as reflected in both the Radian and PES Memoranda was, on its face, nothing more than a very rough attempt to justify a cost-effectiveness balance, it is not surprising that such simplistic analysis cannot be used to indicate accurately either a facility's emissions or how many pieces of equipment it might have. It would thus be meaningless to cite these data as justification for doing now what EPA refused to do in 1984, *i.e.*, claim that the exemption is based on the number of pieces of equipment or the amount of emissions at a plant site.

plate capacity was chosen as the basis for the exemption based on ease of use.

4. Much of the text of the PES Memorandum is repeated virtually verbatim in section 2.8.1 of the BID. In particular, the BID repeats the fact that the Agency considered and rejected basing the exemption on the number of pieces of equipment at a plant site because such a cutoff "could not be applied readily to small or intermittent users of benzene, such as pharmaceutical manufacturers and research and development facilities." Paralleling the PES Memorandum's language selecting an exemption cutoff based on the *"design production capacity"* as represented by a facility's "nameplate capacity," the BID repeats the "design production capacity is easy to apply" sentence from the PES Memorandum, but substitutes the phrase "design usage" for "design production capacity." The Agency—in the BID—thus clearly equates "usage" and "production capacit[ies]." And production capacity—like nameplate capacity—is clearly a single count concept.

5. Consistent with the above-described information indicating that the drafters of the BID were focusing on the amount of benzene produced or consumed by processes, which incidently recycled benzene, the BID also discusses in detail the Agency's calculations of the ambient impacts of a lengthy list of benzene-producing and benzene-using sources. It does so based on a *single counting* of the amount of benzene produced or consumed at such sources. EPA does not, in such modeling, do any multiple counting of benzene being processed by facilities which recycle benzene. Indeed, none of the capacity data studied by EPA in either developing the NESHAPs exemption or showing the alleged toxicological impacts of benzene fugitive emission dispersion, involved quantities inflated by some form of multiple counting of internal reycle. This is despite the fact that virtually all producers and most

benzene-using facilities, by their very nature, have internal recycle.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: September 23, 1995

/s/ E. Bruce Nauman
E. BRUCE NAUMAN, PHD.

State of New York)
County of Albany)

Subscribed and sworn to before me this 2nd day of September, 1995.

/s/ Devinder Singh Uppal
Notary Public

DEVINDER SINGH UPPAL
Notary Public, State of New York
No. 5001587
Qualified in Albany County
Commission Expires September 14, 1996

APPENDIX I

PRINCETON UNIVERSITY

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James Wei, *Dean*
Professor of Chemical Engineering
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August 11, 1995

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United States v. Hoechst Celanese Corporation
Civil Action No. 0 92 1879 17

United States v. Hoechst Celanese Corporation
Civil Action No. 0 93 0864-R

Dear Claudia and David:

Enclosed is my initial report for the above cases.

Yours sincerely,

/s/ James Wei
JAMES WEI
Professor of Chemical Engineering
Dean of Engineering

JW/kem

REPORT OF JAMES WEI

I have studied relevant documents pertaining to the NESHAP for benzene equipment leaks (National Emission Standards for Hazardous Air Pollutants: Benzene Equipment Leaks (Fugitive Emission Sources), 40 CFR Part 61, Subparts J and V) and to Hoechst Celanese Corporation's Celriver Plant in Rock Hill, South Carolina. This report states my opinion as an expert in chemical engineering.

Let me repeat here the language of three key documents in this case:

(a) 40 CFR 61.110(c)(2) (1,000 megagram exemption to the benzene NESHAP):

> "Any equipment in benzene service that is located at a *plant site designed to produce or use less than 1,000 megagrams of benzene per year is exempt from the requirements of § 61.112.*" (Emphasis added.)

(b) NESHAP Benzene Fugitive Emissions—Background Information for Promulgated Standards, pp. 2-104 and 2-105 (June, 1982) (the Background Information Document, or "BID"):

> *"A cutoff based on benzene design usage is reasonable because it is easily understood and can be applied readily to a plant site . . . .* because the design capacity of a plant using or producing benzene can be applied easily, it was chosen as the basis for the cutoff. . . EPA selected a minimum cutoff of 1,000 Mg/year per plant site based on a benzene design usage rate or throughput. *Throughput is determined by a mass balance during the design stages of process operations, accumulating all benzene processed in 1 year.*" (Emphasis added.)

(c) June 13, 1989 letter to Hoechst Celanese Corporation's Celriver Plant from Winston Smith of EPA:

> "throughput . . . is intended to mean the total cumulative flow through the process rather than net benzene consumption or usage."

There is no ambiguity in the words "*plant site designed to produce*" (see (a) above), which mean the rate of shipment to market through plant gates. No expert in chemical engineering would differ from this interpretation.

"[*P*]*lant site designed to . . . use*" (see (a) above) similarly means the rate of shipment from market through plant gates.

"Mass balance" is the systematic analysis based on the principle "input minus output equals accumulation." A modern chemical plant normally has numerous pieces of equipment and recycle loops, and a mass balance can be taken around each piece of equipment or group of equipment, as well as around the overall plant. There is no known precedence in the chemical engineering textbooks where "designed to use" is taken to mean a circulation rate in one or another recycle loop. Only the overall mass balance of a plant is unique and unambiguous, easily understood and readily applied. For a plant with a number of equipment equal to N, the number of possible mass balances is equal to $N*(N+1)$, so that under this doctrine different chemical engineers may choose different mass balances and confuse each other.

The term "throughout" is ordinarily taken to mean overall net production or consumption, not internal circulation rate. The interpretation that "throughput is intended to mean total cumulative flow through equipment in benzene service rather than net consumption or usage," found in EPA's June 13, 1989 letter to the Celriver Plant, demonstrates a surprising ignorance of commonly accepted concepts and practices in chemical engineering. As a past

President of the American Institute of Chemical Engineers, I am concerned that professionally competent members could pronounce such a radical interpretation without citing authorities and textbooks.

I understand that Fred Dimmick was the lead EPA engineer charged with drafting the benzene NESHAP, and that his post-promulgation interpretation of the 1,000 megagram exemption forms the basis of EPA staff's current position. I understand further that David Cole, an employee of an EPA contractor, assisted EPA staff, including Mr. Dimmick, with drafting the benzene NESHAP and its 1,000 megagram exemption. In my search through the records of the membership of the American Institute of Chemical Engineers, I was relieved to find that the presumed experts Fred Dimmick and David Cole are not listed as members. However, as a former advisor to the EPA, I am not gratified with the trust and reliance on less than carefully researched professional advice in this case, and the neglect to consult with the Science Advisory Board.

The following analogy illustrates the fallacy of the EPA staff's current interpretation of "use": A person with a headache may use 2 aspirin tablets per 8 hours for a total of 6 aspirin tablets per day. At a given moment of time, the 2 aspirin tablets are dissolved in 5 liters of blood, which is pumped by the heart at the rate of 5 liters/minute for a person at rest, and circulates in the body 60 times per hour, and at up to six times that rate under heavy exercise. There are many loops and different rates of circulation for various organs and tissues, being higher through the coronary in the heart and in the brain, and much lower through fat deposits. The person is using 6 tablets of aspirin per day, and not $2 \times 60 \times 24 = 2{,}880$ tablets per day—which would be lethal! The accepted usage in chemical engineering here happily agrees with common sense.

In summary, interpreting "plant site designed to use" as the circulation rate in one or another recycle loop is unprecedented, arbitrary, confusing, not easily understood or readily applied, uninformed, and inappropriate. It is also inconsistent with the uncontested interpretation that "plant site designed to produce" means the net producing rate or shipment to market through the plant gates. Indeed, the post-promulgation interpretations by EPA staff of the term "plant site designed to use" represents the fashioning of a "scientific" justification, however insupportable by accepted scientific theory or practice, to buttress a desired conclusion.

[Copy of resume and other information described in Rule 26 of the Federal Rules of Civil Procedure are omitted in printing.]